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RESPIRATORY ALLERGY IN THE COASTAL AREAS OF SOUTH AFRICA

THE CLIMATE FACTORS IN RELATION TO HOUSE-DUST SENSITIVITY *

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Summary of Parts I and II

Numerous sufferers from perennial respiratory allergy have been studied in Johannesburg and in various coastal towns of the Union of South Africa who maintain good allergic health inland but who develop more or less severe respiratory symptoms at the coast. The case-histories are given of a number of these sufferers, who are referred to as the 'Climate group' of respiratory allergy patients.

Evidence is advanced eliminating pollens, atmospheric fungi and other exogenous allergens as aetiological factors.

It is suggested that the precipitation of symptoms at the coast is due to climate, in particular the combination of high temperature and high relative humidity.

Charts are presented of the 'climate patterns' of inland and coastal towns of South Africa in which are contrasted the characteristically wide diurnal and annual range inland of temperature and relative humidity and the narrow diurnal and annual range at the coast.

The problem for consideration is now whether the aggravating symptomatic effect of the coastal climate on this group of sufferers is due to physiological changes resulting from the climate. Such changes for example in the endocrine pattern of the patient may result in possibly greater susceptibility to sensitization. There is however reason to think that the climate factors mentioned do not themselves directly precipitate symptoms. In this group of sufferers there are many who declare that on board ship they enjoy freedom from respiratory symptoms. It will be remembered that the voyage from Cape Town northwards to Europe or America entails passage through equatorial waters for many days when both temperature and humidity are as high as and even higher at certain seasons of the year than in the coastal cities of South Africa. Psychological factors associated with a voyage abroad might of course counter adverse physiological influences. Another argument against the purely physiological effect of heat and humidity in provoking respiratory symptoms derives from evidence from the deep mines of Witwatersrand goldfields in Johannesburg and neighbourhood. In these mines, 5,000-10,000 feet deep, the temperature increases with depth. In many of these mines the humidity is high because of the large quantities of water used for dust control and other purposes (dust of course refers to fine siliceous material from rock breaking). Miners may thus be at work underground for 8 or more hours daily in a climate of higher temperature and relative humidity than obtains in any of the coastal towns. Our studies of respiratory allergy in these miners has so far brought no evidence of exacerbation of respiratory symptoms underground. Further work however in this connection is being carried out. The obvious alternative suggestion to the idea that climate affects the patient physiologically is that high temperature and high relative humidity render potential sensitizing substances more highly allergenic. The results of our investigations of this aspect of the matter are reported below.

Maunsell[3] studying the occurrence of asthma in Britain put forward the hypothesis that in houses built on damp soil, fungi found favourable conditions to break down the fibres of animal and plant origin of the complex of house-dust antigen and that a greater quantity of dust antigen may thus be present per unit of house-dust. At the same time Harsh[4] discussing the relationship between humidity and house-dust sensitivity was of opinion that the chief reason for the greater incidence of respiratory allergy in a humid climate is not the climate *per se* but that the humidity rendered house-dust and possibly certain other inhalants more allergenic by favouring the action of micro-organisms on certain constituents of the dust.

As indicated previously[5] no confirmation was obtained that air-borne fungi were allergenically important in climate asthma although admittedly there was an increased growth

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of such fungi in the warm humid coastal regions, more especially on the east coast of the Union of South Africa.

The possibility that house dust was in fact rendered more allergenically potent by climate factors through the agency of fungal or bacterial growth remained to be considered. It was therefore decided to make a systematic comparative study of house dust collected at the coast and house dust collected inland. Chemical and electrophoretic investigations are being carried out on these dusts, the extracts of which were used in the skin-testing of respiratory allergy sufferers.

The first experiments were done with extracts in Coca's fluid of coastal dust obtained from Durban, and inland dust from Johannesburg. Identical weight-volume mixtures were extracted for 24 hours at room temperature, filtered through paper filters, and then submitted to Seitz filtration and sterility control tests. In addition to the original extracts, which were regarded as of full strength (1/1), dilutions of 1/1000, 1/100, 1/10 of this strength were also prepared for use in skin testing.

The allergic potency of these extracts was determined by the method of Rimington and Maunsell[6] for estimating the 'threshold concentration' for each dust extract. The patient's skin was titrated by intradermal injection of 0·02 ml. of the above serial dilutions, the end-point being the dilution which just gave a definitely positive reaction. Skin tests with dilution of extracts of inland and coastal house-dust extracts all carried out at the same session were performed on 123 allergic patients. The results of these tests are shown in Table I. It will be observed that in 90 patients there was no reaction to inland house-dust extract even at the highest concentration used. Of these more than half reacted to 1/50 or higher dilution of the coastal house-dust extract and the remainder to a 1/10 or lower dilution. In 22 patients where the reaction was positive to both inland and coastal house-dust extracts the reaction to the latter was obtained with somewhat higher dilutions. Eleven patients were found sensitive to inland house dust alone. The explanation for this is as yet not clear.

TABLE I. COMPARATIVE 'THRESHOLD CONCENTRATION' OF INLAND AND COASTAL HOUSE DUST EXTRACTS

Number of Patients	Highest Dilutions of House-dust Extracts to which Patients Reacted by Skin Tests									
	Inland					Coastal				
	1/1	1/10	1/50	1/100	1/1000	1/1	1/10	1/50	1/100	1/1000
22			Negative			+				
21			Negative				+			
35			Negative					+		
12 = 90			Negative						+	
7	+					+				
1	+						+			
1 = 9	+							+		
5		+				+				
1 = 6		+					+			
1			+							+
1			+					+		
1			+						+	
1 = 4			+				+			
2				+					+	+
1 = 3				+						
6	+							Negative		
4 = 10		+						Negative		
1		+				+				
1 = 1										

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The above findings, which indicate that Durban house dust is more highly allergenic than the house dust from Johannesburg, should be given due weight in assessing the merit of explanations regarding the aggravation of symptoms at the coast. Much, however, remains to be done, not only to confirm these findings with further groups of patients, but also with the use of house-dust extracts and their purified antigens from other coastal and inland towns.

In view of the evidence so far obtained of the higher allergenicity of coastal house dust an investigation is in progress to discover whether the 'Climate group' respiratory allergy patients whose symptoms are aggravated when they visit the coast can be effectively desensitized with coastal house-dust extract to permit their future enjoyment of symptom-free coastal visits. The marked benefit accruing to the small number of patients so far desensitized in this way has been encouraging.

SUMMARY

The question is considered whether climate acts physiologically *per se* in the climate respiratory allergy sufferers or whether the combination of high temperature and high relative humidity renders potential sensitizing substances, such as house dust, more highly allergenic to allergic subjects.

The allergenic potency of house dust collected at the coast has been compared with that collected inland by the 'threshold concentration' skin-testing method carried out on allergic patients.

Coastal house dust is shown to be more highly allergenic than inland house dust.

Further work in connection with these investigations is outlined. There are indications that patients of the climate respiratory allergy group are benefited by desensitization with extracts of coastal house dust.

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EDITORIAL

PERIURETERITIS FIBROSA

In the crop of clinical entities that each year produces, none is likely to be more perplexing than periureteritis fibrosa—probably the most recently recognized distinct disease entity arising in the retroperitoneal space. The most concrete definition of the condition is to describe its pathology: a non-specific progressive fibrosis in the peri-ureteric fascial space, which eventually envelops the ureters and disturbs their function. Beyond that statement of fact, all is vague. The clinical picture is bizarre in the extreme, presenting in a variety of ways—backache, abdominal pain, sudden anuria or slow impairment of renal function. Laboratory and X-ray tests may be negative in the beginning, and thereby allay the doctor's fears for the health of his patient; or, worse still, the persistence of symptoms in the absence of signs may drive him to diagnose a functional disorder.

The great difficulty, then, is recognition. Pathological conditions of the retroperitoneal space are notoriously difficult of diagnosis. One arresting symptom, said to be helpful when it occurs, is the peculiar posture adopted by the patient with severe pain from the condition; he prefers to lie with his face down, 'buckling over the edge of the bed'[1]—perhaps to obtain the relief which gravity can afford him. Another diagnostically important feature is the obvious presence of pain in the absence of physical signs. This is said to be characteristic of an expanding retroperitoneal lesion, but it would be easy to fob off the patient—particularly if the ancillary diagnostic tests are negative or inconclusive, as they frequently are—with a lotion for his backache, an antacid for his ulcer, or a diuretic for his kidneys. There are no signs of specific inflammation—the erythrocyte sedimentation rate remains normal, pyrexia is late and due to secondary complications, no regional lymphadenitis occurs, and all biopsy material has been consistently negative on laboratory culture and inoculation for tuberculosis. Moreover, the condition appears to be self-limiting; patency of the urinary outflow from the kidneys may become re-established without apparent cause. Radiography may do more harm than good, for concomitant *bona fide* lesions may be discovered which have the effect of diverting attention from the true diagnosis. In one of Raper's cases an unrelated peptic ulcer was found;[2] in another case (complaining of backache) a malignant spinal tumour was suspected and the patient submitted to deep X-ray therapy before the true diagnosis of periureteritis was made.[3] Intravenous pyelogram may show a unilateral unexplained

VAN DIE REDAKSIE

PERIURETERITIS FIBROSA

Van al die siektes wat elke jaar in die kliniek as eenhede uitgeken word, is periureteritis fibrosa—die jongste selfstandige siekte-eenheid wat agter in die buikholte ontstaan—seker die verwarrendste. Die mees konkrete definisie van hierdie siektetoestand is die beskrywing van sy patologie: 'n onbepaalde, toenemende fibrose van die bindweefselspasie rondom die urinebuis, wat uiteindelik die ureters omgewe en hul werking belemmer. Afgesien van hierdie feiteverklaring is alles vaag. Die kliniese beeld is uiters bizar; die siekte kan op verskillende wyses presenteer—rugpyn, buikpyn, skielike urienloosheid of geleidelike versteuring van nierwerking. Aan die begin kan die laboratorium- en X-straaltoetse negatief wees en dus die dokter gerus stel oor sy pasiënt se toestand; of, nog erger, die voortduur van simptome terwyl siektetekens uitbly kan hom dwing om 'n funksionele stoornis te diagnoseer.

Die groot moeilikheid is dus om die siekte uit te ken. Patologiese toestande van die retroperitonele holte is berug om die moeilikhede wat hulle by diagnose oplewer. 'n Merkwaardige simptoom, wat glo baie behulpsaam is wanneer dit voorkom, is die eienaardige houding wat die pasiënt ineem as hy baie pyn weens dié siekte verduur: hy lê liefs op sy maag, omgekrul oor die rand van die bed[1]'—miskien omdat hy op dié manier weens swaartekrag verligting vind. Nog 'n diagnostiese kenmerk is dat die pasiënt duidelik pyn verduur hoewel daar liggaamlik geen tekens gevind kan word nie. Na bewering is dit tipies van 'n groeiende retroperitonele letsel maar, veral as die bykomende toetse negatief of onoortuigend is, soos dit so dikwels gebeur, is dit maklik om die pasiënt te ‚paai' met 'n smeermiddel vir sy rugpyn, 'n teensuur vir sy maagseer of 'n diuretiese middel vir sy niere. Daar is geen tekens van spesifieke inflammasie nie—die eritrosiet-besinkingspoed bly normaal, koors verskyn eers later en dan is dit die gevolg van sekondêre komplikasies, daar is geen streek-limfklierontsteking nie, en alle biopsiemateriaal was nog altyd negatief by laboratoriumkweking en inenting vir tering. Ook blyk dit dat die toestand sigself beperk: die urienuitskeiding uit die niere kan ewe skielik sonder enige ooglopende rede weer vryelik begin. Radiografie kan meer kwaad as goed verrig omdat ander *bona fide* letsels ontdek kan word wat die dokter kan mislei en die eintlike siekte kan maskeer. By een van Raper se gevalle is 'n onverwante maagseer ontdek;[2] by 'n ander pasiënt (wat oor rugpyn gekla het) was 'n kwaadaardige ruggraatgewas vermoed en is die pasiënt onderwerp aan diep X-straalterapie voordat die eintlike kwaal van periureteritis gediagnoseer is.[3] 'n Binneaarse piëlogram kan moontlik 'n eensydige, onverklaarde hidronefrose aandui, of miskien slegs oopgesperde kelke met 'n donker uretersegment

hydronephrosis, or perhaps merely dilated calyces with an obliterated ureteric segment—which the radiologist may be excused for assuming to be due to spasm from ureteric peristalsis. In the cases so far described (mostly from the Massachusetts General Hospital[3, 4]) ureteric involvement with consequent renal functional impairment was a late feature of the condition. One recent case underwent laparotomy after 4 months of vague abdominal pain and weight loss but no renal impairment. At operation an ill-defined retroperitoneal mass was found in the lumbar region, which was considered by the surgeon to contain necrotic areas but which upon microscopic section showed merely 'subacute and chronic inflammation with fibrosis'. When the surgeon released the ureter from its fibrous web, the symptoms receded and the patient recovered. A second patient, presenting with acute anuria following several months of abdominal 'soreness', was found on laparotomy to have 'a retroperitoneal inflammatory process' that enveloped the ureters and caused obstruction to the outflow of urine. The ureters were freed and the patient recovered. It thus seems that this entity (for such it is) can sometimes only be diagnosed at operation—and then not invariably, unless it is specifically suspected or biopsy material taken. Certainly it represents a challenge to the skill of the whole clinical team.

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4. *Idem* (1957): *Ibid.*, 256, 1198.

—en die radioloog kan vergewe word as hy aanneem dat dit die gevolg van kramp weens ureterperistalsis is. By die gevalle wat dusver beskryf is (die meeste is afkomstig uit die Massachusetts Algemene Hospitaal[3, 4]) was ureter-aantasting en gevolglike nierfunksiebelemmering 'n laatverskynsel by hierdie siekte. 'n Onlangse geval het na 4 maande van vae buikpyn en gewigafname, sonder nierbelemmering, 'n laparotomie ondergaan. Tydens die operasie is 'n vaag omskrewe retroperitonele massa in die lendestreek gevind, en die chirurg het gemeen dat dit nekrotiese areas bevat. By mikroskopiese seksie is dit egter bevind dat hierdie massa slegs ‚subakute en kroniese inflammasie met fibrose' was. Nadat die chirurg die ureter van sy fibreuse netwerk bevry het, het die simptome vervaag en die pasiënt herstel. By 'n tweede pasiënt, wat met akute anurie volgend op maandelange ‚seerheid' in die buik gepresenteer het, is dit by laparotomie bevind dat daar 'n ‚inflammasie-streek in die agter-buikholte' was wat die ureters omvou het en die vloei van die urien belemmer het. Die ureters is losgemaak en die pasiënt het herstel. Dit blyk dus dat hierdie siekte-eenheid (want dit *is* 'n siekte-eenheid) soms alleen operatief gediagnoseer kan word—en dan ook nie altyd nie, tensy dit spesifiek vermoed word of tensy biopsiemateriaal geneem word. Dit stel gewis die vaardigheid van die hele kliniese span op die proef.

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THE SPRUE SYNDROME

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Malabsorption from the gastro-intestinal tract is usually described by its most prominent feature, steatorrhoea. The presence of excessive amounts of fat in the stools leads to the passage of bulky, offensive motions. This is not always obvious, and the patient may present with secondary effects due to the deficient absorption of vitamins, minerals and calories, etc. In some cases the steatorrhoea is due to lack of digestive secretions, as in chronic obstructive jaundice and pancreatic disease; inefficient mixing of food with enzymes is thought to account for a proportion of cases of post-gastrectomy steatorrhoea.[54] It is not proposed to discuss these further, but to concentrate on the enterogenous steatorrhoeas, where the fault lies in the lumen or wall of the small bowel.

The enterogenous steatorrhoeas have many features in common (see below). There are 3 sub-groups: those cases with gross irreversible changes in the bowel wall, those where abnormal anatomical factors produce stagnation, and the sprue syndrome. Among the group with irreversible pathological changes are regional enteritis, lymphoma, Whipple's disease, amyloid, and scleroderma. Active tuberculous enteritis is probably a less important cause than it was thought to be, and Franz J. Ingelfinger[11] stresses that steatorrhoea is rarely due to lymphatic blockage by tuberculous mesenteric adenitis.

In the group of anatomical disorders stagnation of intestinal contents facilitates the growth of an abnormal bacterial flora with an avidity for essential nutritional factors.[24, 57] The ability of certain strains of *Str. faecalis*, when provided with bicarbonate and folic acid, to synthesize significant amounts of fats *in vitro* is of great significance in this regard.[48] The sufferer from the stagnation syndrome is thus deprived of important dietary constituents and, in addition, the remainder of the small bowel is irritated by overflowing exudates. The causes are multiple intestinal strictures,[9] blind loops of small intestine[14, 33] and jejunal diverticulosis.[2] In some, but not all, cases, strictures are due to healing of tuberculous girdle ulcers. Examples of blind loops are entero-anastomosis, gastro-jejuno-colic fistula, inadvertent gastro-ileostomy and internal fistula. Multiple jejunal diverticula are of congenital origin. Massive intestinal resection is not an important factor in producing a sprue-like picture if the remaining bowel is healthy.[33]

The remaining cases of enterogenous steatorrhoea may be considered as belonging to the 'sprue syndrome'. Admittedly such a definition, which depends on exclusion rather than on positive features, is hardly satisfactory, but prevailing knowledge of the syndrome has not permitted a more precise statement. However, newer discoveries (see below) indicate

the pathological basis of the condition; future definitions will presumably be along these lines.

Methods of differentiating the steatorrhoeas and of assessing the severity of the absorptive defect have previously been discussed.[37] The first step towards the diagnosis of the sprue syndrome lies in the identification of the steatorrhoea as being of the enterogenous type. Pancreatogenous and hepatogenous steatorrhoeas have specific features of their own, but the distinction is not always easy. Some of the important characteristics of the enterogenous steatorrhoeas, useful in differential diagnosis, are flattened oral-glucose and vitamin-A tolerance curves, decreased absorption of xylose[4] and, in certain types, clumping of flocculable barium with dilatation of the small bowel[22] (an abnormal mucosal pattern is seen when a non-flocculating suspension is used[1]). Marshak *et al.*[41] found that this radiological feature is confined to cases of the sprue syndrome, Whipple's disease, and steatorrhoea due to intestinal lymphoma. It is not seen in blind-loop malabsorption;[24] we have encountered it in a patient in whom steatorrhoea resulted from a combination of massive intestinal resection and jejunal strictures due to regional enteritis.[38] Where it does occur, there is thought to be an excess of irritating short-chain fatty acids provoking increased intestinal secretion of mucus. Frazer *et al.*[22] were able, *in vivo*, to induce radiological clumping of the usual type of barium by instilling fatty acids or mucus into the small intestine of normal people; *in vitro* they produced flocculation of the barium by adding mucus-containing secretions to it.

Within the term sprue syndrome one includes coeliac disease, tropical sprue and idiopathic steatorrhoea. (In the American literature the term 'non-tropical sprue' is used to describe the latter.) For many years it was believed that these conditions were unaccompanied by specific pathological changes in the gut. Thaysen[52] considered that the lesions which had been described in tropical sprue—desquamation and degeneration of the epithelium and atrophy of the intestinal wall—were post-mortem changes. Likewise, in its counterpart in temperate climates, idiopathic steatorrhoea, it was until recently thought that no anatomical lesion was present[14] and that the 'clinical picture is dependent upon a disturbance of gastro-intestinal function'.[3] The recent invention of per-oral small-intestinal biopsy tubes[17, 49, 51] provides a simple and reliable method for the study of specimens of jejunal mucosa; one can now make a definitive instead of a presumptive diagnosis of the sprue syndrome. In the following case the biopsy specimens were obtained at laparotomy.

CASE REPORT

M.S., a 30-year-old European female, entered the Groote Schuur Hospital on 5 July 1957 with a 5-year history of diarrhoea. While she passed stools almost hourly during the first year, she has subsequently averaged 5 bowel actions a day. Her stools are loose, bulky, pale and offensive; they float and often contain recognizable food residue. For this same period she has been badly troubled by abdominal distension and cramps. Occasional rectal bleeding has been related to haemorrhoids.

She first noticed brown 'freckles' on her arms, trunk and legs 15 years ago; these have steadily increased in number. In addition, during the past 3 years her face has become diffusely darker. Tetany has also been present for 3 years; she gets attacks of respiratory difficulty ('tightening of the throat') associated with carpopedal spasms. While she has occasionally noted small ulcers on the tip of the tongue since childhood, glossitis, with a sore red tongue, first occurred 2½ years ago; it responded to vitamin-B therapy. During the past 2 years she has suffered from non-deforming arthritis—painful swelling of the wrists, elbows, fingers, ankles and knees. One or more joints may be affected at a time for periods of up to 2 weeks; there is no heat, redness or residual stiffness. There has been no bleeding tendency.

She tires easily but does not get short of breath. There has been considerable weight loss; at her worst she had dropped a total of 42 lb., but had regained 20 lb. by the time she was admitted to this hospital. Her appetite has been consistently good.

Past History. There was no history of diarrhoea or abdominal distension during childhood. Both ovaries had been removed for dermoid cysts, the left 6 years ago and the right 2 years later. Appendicectomy was performed at the second operation.

Studies and treatment before admission

The diarrhoea was first diagnosed as being due to amoebic dysentery, but there was no response to treatment with emetine and yatren. Later, at another hospital, it was considered to be caused by ulcerative colitis, but her condition deteriorated sharply on treatment for this. At yet another hospital she was thought to be suffering from psychogenic diarrhoea and was submitted to insulin shock therapy, with unsatisfactory results.

Earlier this year she was investigated at the Frere Hospital, East London, where the findings on physical examination and the blood counts were much the same as in this hospital (see below). *Stools* contained much fat in all stages of saponification; there were no ova, cysts or parasites. The Sulkowitch test on the urine was negative; a water diuresis test was abnormal (intake 1500 ml., 5-hour output 870 ml.). *Serum analyses:* Calcium 5·6 mg.%; electrolytes (mEq. per. l.)—sodium 138, potassium 3·9, chloride 102; protein 5·5 g.% with normal electrophoretic pattern. *Radiography:* Barium meal—dilated small bowel, with segmentation and loss of normal mucosal pattern; chest, hands, lumbar spine, pelvis and barium enema were normal. *Treatment* with a fat-free, gluten-free diet, pancreatin, oral and parenteral calcium, vitamin D and AT10 controlled the tetany (the serum calcium rose to 6·8 mg.%) but had little other effect. There were no dramatic results from folic acid, but there was great improvement when steroids were given (ACTH, 80 units daily for 4 days, then 40 units daily for 10 days, followed by prednisone, 10 mg. b.d. for 8 days). Her stools became almost normal in amount and appearance and she felt much better. This therapy was stopped because of fluid retention, but the improvement was partially maintained up to the time of her admission to this hospital 3 weeks later.

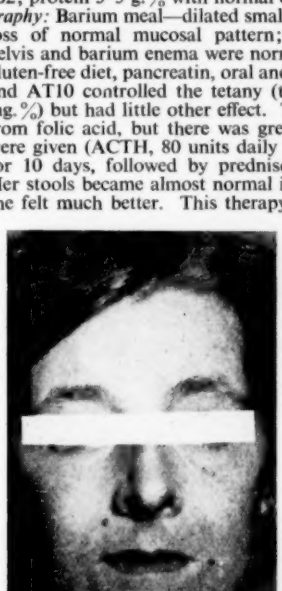

Fig. 1.

Examination

The patient was thin but not wasted (weight 97 lb.). The mucosae were normally coloured; there was no buccal pigmentation. The fingers were not clubbed and there was no peripheral lymphadenopathy. There was moderate diffuse darkening of the face, and the trunk, arms and legs were studded with brown 'freckles' 1-3 cm. in diameter. The skin near these macules urticated easily when rubbed. Her face was not rounded and the zygomatic arches were not prominent (Fig. 1). Chvostek's and Trousseau's signs were negative. Her attitude showed moderate anxiety, introspection and emotionalism. *Cardiovascular system:* No venous distension or oedema; blood pressure 110/80 mm. Hg; heart size and sounds normal. *Alimentary system:* the mouth and fauces were normal. Gaseous distension of the abdomen

was marked. The liver was firm and smooth and its lower edge was felt 3 finger-breadths beneath the right costal margin. The spleen was soft; its tip was easily palpable. Rectal examination was negative save for the presence of small haemorrhoids. The *respiratory and nervous systems* were intact. The *joints* were unremarkable. The *urine* was normal. *Blood:* Hb 13 g.%, VCP 40%, ESR 7 mm. in the first hour (Westergren), WBC 5000 per c.mm. with 58% neutrophils and 42% lymphocytes. A peripheral blood smear was normochromic and normocytic, and platelets were abundant.

Studies at this Hospital

Blood urea 32 mg.%. Serum cholesterol 166 mg.%, albumin 4·6 and globulin 1·2 g.%; thymol turbidity 1, zinc turbidity 7; van den Bergh reaction negative and bilirubin 0·5 mg.%; calcium 9·8 and inorganic phosphorus 2·9 mg.%. Serum electrolytes (mEq. per l.): Sodium 142, potassium 2·7, chloride 105. Prothrombin index 86. Blood group O, Rh+. Gastric analysis: No free acid with caffeine stimulus; augmented histamine test—low level of secretion (0·46 mEq. free HCl an hour = 8 mEq. per l.). Urinary calcium excretion 87 mg./24 hours; 17-ketosteroid output 4·1 mg.%; urinary 5-HIAA normal (5 g. per ml. = 9·9 mg. per g. creatinine).

Benzidine tests on the stool were negative for occult blood. Sigmoidoscopy was normal. A 3-day fat balance (intake 70 g. per day) showed 85·5% absorption (normal 95-100%). An oral glucose tolerance test revealed a flat curve (fasting 92 mg.%; ½-hour 98; 1 hour 103; 1½ hours 103; 2 hours 92). Xylose absorption: 3·7 g. passed in the urine during the 5 hours after the oral administration of 25 g. of d-xylose (see below).

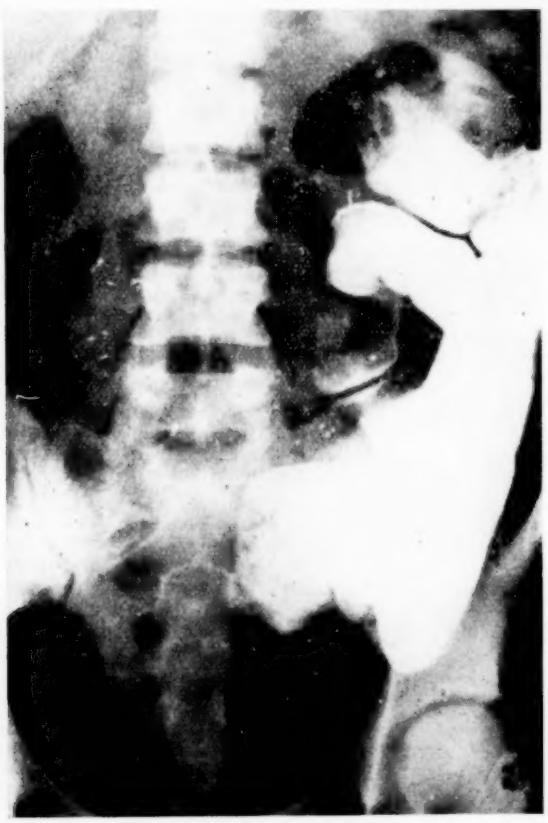

Fig. 2. Barium-meal X-ray.

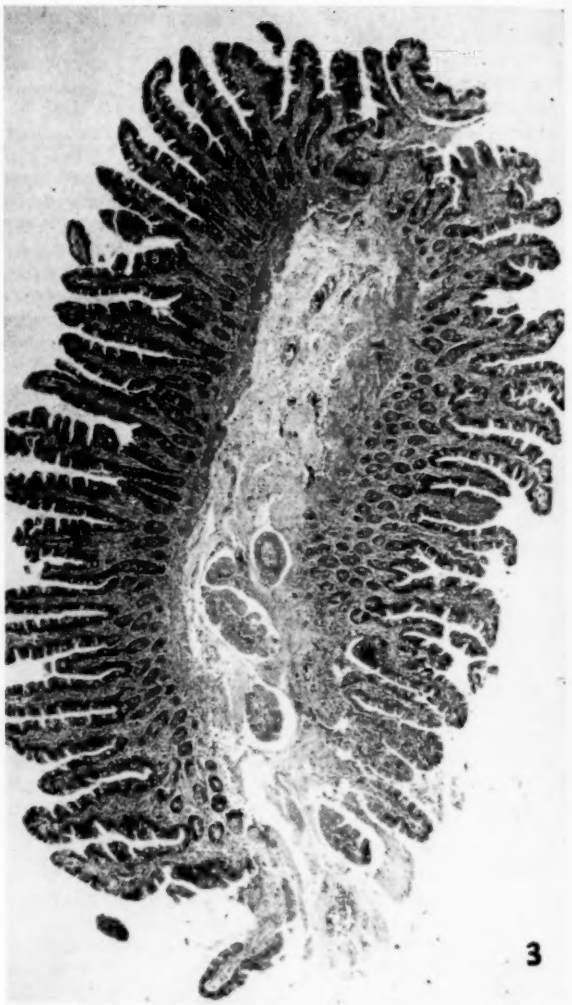

Fig. 3. Complete jejunal biopsy specimen taken from a normal patient with the Shiner tube (H. and E., × 45). Note the thin frond-like villi and the long narrow glands of Lieberkuhn; goblet cells are scanty. By courtesy of Dr. M. Shiner.

Barium-meal examination with a non-flocculating suspension: A normal small-bowel mucosal pattern could not be seen; there was dilatation of the jejunum and ileum and marked delay in transit (Fig. 2). Two electrocardiographs were normal. Skin biopsy: There was much melanin in the basal layer of the epidermis and numbers of mast cells were seen in the corium (Dr. G. Selzer). A needle biopsy of the liver was normal; the Kupffer cells did not take up the periodic-acid-Schiff stain (Dr. G. Selzer).

Course

A high-protein, low-fat, moderate-carbohydrate diet was given, with vitamin, calcium and potassium supplements. After a week the serum potassium had risen to 4·6 mEq. per l.

It was felt that the only way to establish the diagnosis was to perform a laparotomy; this took place on 1 August 1957 (Dr. D. J. du Plessis). The small bowel was very flabby and atonic. There were large lymph nodes along the whole length of the mesentery. Lacteals were not visible in the bowel or mesentery

and there were no adhesions, obstructions or fistulae. The pancreas was normal. The spleen was slightly enlarged. Appendicectomy and bilateral ovariectomy had previously been performed, but the pelvis was quite free of adhesions. Biopsy specimens were taken from upper jejunum and lower ileum and of lymph nodes near either site. These were considered (Dr. C. J. Uys) as being compatible with the appearances described by Shiner in non-tropical sprue.[50] The features were 'clubbing' of the villi and a diffuse mucosal infiltrate of eosinophils, histiocytes and lymphocytes. The periodic-acid-Schiff stain was negative. Fig. 3 shows a complete jejunal biopsy specimen taken from a normal patient (Shiner). Fig. 4 is from the jejunal biopsy taken from our patient M.S. One

Fig. 4. Jejunal biopsy from M.S. (H. and E., × 180). See text.

foreign-body granuloma, containing doubly refractile material, was seen on the serosa of the ileal biopsy specimen and was thought to have resulted from previous surgery. The lymph nodes showed sinus hyperplasia.

The post-operative course was excellent and was marred only by an episode of tetany on the 2nd day. The serum calcium at that time was 7·4 mg.% and the patient responded rapidly to intravenous calcium gluconate. In view of the previous steroid therapy, 100 mg. of hydrocortisone was given in the intravenous infusion on the day of the operation; the dosage was tapered off so that, by the 5th day, she was receiving 15 mg. prednisone a day. She also received the pre-operative diet, oral supplements of calcium, potassium, vitamin-B complex and folic acid, and single injections of vitamin B12 (1000 μg.) and vitamin D (500,000 units).

DISCUSSION

The type of steatorrhoea was obviously enterogenous; all the features of that group were present. More precise diagnosis rested on the interpretation of other associated clinical, biochemical and pathological findings. The most obvious of these were the skin changes; the case showed two different types of pigmentation—'freckling' for 15 years and diffuse facial darkening for 5 years. Dr. Jean Walker felt that the former had the clinical and histological features of urticaria pigmentosa (disseminate pigmented mastocytosis). The possible link between the mastocytoses and metastatic carcinoid syndrome have recently been emphasized by Marshall *et al.*,[42] who reported 2 cases of cutaneous flushing associated with mastocytoma; both argentaffin and mast cells secrete 5-hydroxy-tryptamine. Because Warthin[12] and Waldmann *et al.*[55] noted a sprue-like picture in argentaffinomatosis, the urinary 5-hydroxy-indole-acetic acid was measured in this patient, but was normal. There were no other findings to suggest the metastatic carcinoid syndrome, and liver biopsy was negative; several cases of this condition have been studied at the Groote Schuur Hospital.[39]

The major clinical features in this patient seemed to indicate a triad of enterogenous steatorrhoea, diffuse facial pigmentation, and arthritis, and a tentative diagnosis of Whipple's disease was made. Approximately 60 cases of this interesting disorder have been described.[7, 8, 47] It has a characteristic histology[35]—the tunica propria of the small bowel and the mesenteric lymph nodes are filled with macrophages which contain a material that takes up the periodic-acid-Schiff stain but not Sudan-black. R. B. Cohen[12] stresses that there is not enough histochemical evidence to group Whipple's disease with the collagenoses. He considers that, while the material in the macrophages is probably in part a carbohydrate, the presence of a lipoid or lipoprotein component cannot be excluded. Of considerable practical interest is the discovery by Korsch (quoted by Calahane[10]) that the lesions can occur in extra-abdominal lymph nodes and the demonstration, in 3 cases, of Schiff-positive macrophages in these sites.[46] While this is of great diagnostic value, in the case discussed by T. A. Warthin[12] a peripheral-node biopsy was negative (the diagnosis was confirmed by jejunal tube biopsy). The present patient did not have palpable lymph nodes. In the hope that the Kupffer cells, being macrophages, might contain Schiff-positive material, liver biopsy was performed, but was negative.

Many workers stress the importance of histological proof of the diagnosis of Whipple's disease—by laparotomy if necessary[8, 12, 35]—in view of the favourable effect of steroids on the clinical manifestations of the illness. Interestingly enough, the lesions persist in spite of clinical improvement.[35]

Another reason for performing laparotomy was the need to exclude a surgically correctable cause;[23] she had previously had abdominal operations and the remote possibility of intestinal strictures or a blind loop had to be considered. At laparotomy the small intestine was found to be flabby and there were many large lymph nodes in the mesentery. This seemed to confirm the suggestion of Whipple's disease, yet histologically the nodes showed only reactive changes. Himes and Adlersberg,[29] in their report on 11 autopsy cases of sprue, found mesenteric-node enlargement in 5 cases, with chronic lymphadenitis in 3 of these. Clinically, too, peripheral-node enlargement is not uncommon in the sprue syndrome; Bossak *et al.*[6] found this in 11·7% of their 94 cases. The same percentage of patients showed skin pigmentation; Himes and Adlersberg[29] found an excess of melanin in 3 out of 5 cases examined at autopsy.

PATHOLOGY

The histological appearances recently described in cases of the sprue syndrome[50] appear to indicate an atrophic process; further studies are required to determine their specificity. The changes consist of: Reduction in the size of the villi (ranging from 'clubbing' to almost complete flattening); epithelial cellular degeneration; oedema, congestion and inflammatory cell infiltration of the villous stroma; variable increase in goblet cells; and a tendency towards gaping of the crypts and distension of the glands of Lieberkuhn. These appearances were well seen in the present case (Fig. 4) and make a striking contrast to the normal structure of the jejunum (Fig. 3). Doniach and Shiner[20] very tentatively suggest that the malabsorption might be due to the tremendous loss of villous surface epithelium.

It does seem significant that there is good correlation between these signs and the presence of an abnormal radiological pattern in the small intestine. Shiner[50] performed biopsies on 17 patients with steatorrhoea. In 4 of these (pancreatic disease 1, post-gastrectomy 2, chylous obstruction 1) histology was normal and there was no barium clumping on X-ray. One patient (suffering either from idiopathic or post-gastrectomy steatorrhoea) had an equivocal biopsy and showed clumping on barium meal. In the remaining 12 cases there were varying degrees of atrophy and clumping: 10 suffered from idiopathic steatorrhoea, 1 from tropical sprue and 1 from either idiopathic steatorrhoea or intestinal tuberculosis.

Paulley[44] found this atrophic jejunitis in 3 cases of idiopathic steatorrhoea from whom biopsies were taken at laparotomy. Himes and Adlersberg[29] reported similar intestinal changes in autopsy cases. In steatorrhoea following subtotal gastrectomy biopsy studies have failed to reveal consistent changes in the jejunal mucosa.[43, 50]

Of the 11 autopsy cases of sprue recorded by Himes and Adlersberg 4 had pancreatic fibrosis.[29] Volwiler[54] considers that this is due to protein lack; it is probably secondary to malnutrition and analogous to the biochemical and pathological findings in a case of massive intestinal resection[31, 40] (and perhaps in a patient with intestinal lymphoma at first thought to be suffering from idiopathic steatorrhoea[31, 32]).

In view of recent reports of the association of steatorrhoea with hyperparathyroidism[18], and hypoparathyoidism[30], it is of interest that Himes and Adlersberg found the parathyroids to be histologically normal in 4 cases and to show connective tissue proliferation in 1; the glands were not examined in the remaining 6 cases.[29] Only in their single case that had received prolonged steroid therapy was there thinning of the adrenal cortex.

CLINICAL FEATURES

While there are no obvious pathological differences in the intestinal lesions of tropical and non-tropical sprue, there are important clinical distinctions. Whether these imply a different pathogenesis is uncertain. Bossak *et al.*[6] separated their 27 Puerto Rican patients from 67 cases from the continental United States; like Perez-Santiago and Butterworth[45] they found a higher incidence of megaloblastic anaemia and glossitis in tropical sprue. In non-tropical cases clubbing of the fingers, hypocalcaemic manifestations and a bleeding tendency are commoner. The latter is due to hypoprothrombinaemia resulting from under-absorption of vitamin K.[56] The present patient did not have a bleeding tendency; her prothrombin index was 86 (after steroid therapy).

While splenomegaly is more likely to be found in tropical sprue[6] it does occur in non-tropical cases, and was present in the patient under discussion. The reason for its occurrence is not known; presumably the excess in the tropical group is partly due to locally endemic disease e.g. schistosomiasis in Puerto Rico. Glossitis was not noted at the time of admission but does, of course, occur in both types; in fact, the name of the syndrome is derived from *sprouw*, the Dutch word for aphthous stomatitis.

Intermittent abdominal cramps and considerable bloating were troublesome in the present case. The possibility of partial intestinal obstruction was excluded at operation. Several cases of sprue have been recorded in which gaseous distension of the gut was so severe as to necessitate emergency diagnostic laparotomy;[35] in some of these volvulus of the colon had actually developed and led to intestinal obstruction.[15, 25]

The psychological status of sprue patients has been discussed by Cooke *et al.*;[15] unlike previous workers they found a low incidence of symptoms of anxiety and depression. They stress the relative psychological normality of their cases as compared with sufferers from ulcerative colitis. The symptoms of psychological disturbance present in the patient under consideration were, in the opinion of the consultant psychiatrist, explicable on other grounds.

Her arthritis is not explained by the diagnosis of non-tropical sprue, and its occurrence is presumably coincidental. Her face (Fig. 1) has not the rounded configuration with prominent zygomatic arches reported in females with idiopathic steatorrhoea—it actually looks more triangular, as it is said to be in males with this condition.[3]

Benson *et al.*[4] consider that the d-xylose absorption test is one of the most valuable investigations in the differentiation of the steatorrhoeas; they found it much more reliable than the glucose tolerance test. Decreased absorption is found only in the enterogenous steatorrhoeas. The subject drinks 25 g. d-xylose, a pentose that has little, if any, metabolic activity, and all urine passed during the following 5 hours is collected and analysed. Normally $6{\cdot}5 \pm 1{\cdot}2$ g. of xylose is excreted; their untreated sprue patients passed $1{\cdot}3 \pm 0{\cdot}7$ g., and cases in remission $3{\cdot}0 \pm 1{\cdot}2$ g. The excretion of 3·7 g. in the present case is in keeping with the state of partial clinical remission.

Recently a sprue-like syndrome has been described in association with agammaglobulinaemia;[5, 16] although her serum globulin was low (1·2 g.%) the electrophoretic pattern was normal.

AETIOLOGICAL ASPECTS

W. F. Dicke (quoted by Frazer[21]) showed that coeliac disease is due to sensitivity to the gluten fraction of wheat and rye. C. M. Anderson *et al.* (quoted by Frazer[21]) have described adult cases of gluten-induced enteropathy, and Di Sant'Agnese[19] indicated that cases of coeliac disease may subsequently present with absorptive defects in adult life. However, not all non-tropical sprue is due to gluten-induced enteropathy, even though the latter is an important cause of enterogenous steatorrhoea.[21]

Although bacterial or other infection has been advanced as the cause of tropical sprue, final proof is lacking; the

implications of the discovery of a fat-forming enterococcus[48] remain to be assessed. The demonstration that absorption in the stagnation syndrome (jejunal diverticulosis,[2] blind loops[26]) is improved by bowel sterilization with chlortetracycline (but, strangely enough, not with neomycin) may well be significant in this regard.

Hawkins[28] has reported a case of tubular jejunal stenosis, resembling Crohn's disease, following on mesenteric arterial occlusion, and Klass[36] has had several cases of malabsorption after mesenteric embolectomy. Three such cases have recently been studied at the Massachusetts General Hospital.[53] These developments may necessitate review of the possible aetiology in some cases at present labelled 'idiopathic steatorrhoea'; Klass[36] suggests that elderly people with abdominal colic and malabsorption may be suffering from 'mesenteric strokes'.

The importance of fibrocystic disease of the pancreas as a cause of steatorrhoea in childhood is now well recognized.

TREATMENT

Colcher and Adlersberg[13] stress the importance of diet (high-protein, low-fat, low-starch), vitamins and haematinics, and, in severe or non-responsive cases, steroids. Judging by her clinical and biochemical improvement the present patient had undergone a partial steroid-induced remission at the time of her entry to Groote Schuur Hospital. That this is symptomatic control rather than cure is indicated by Shiner's finding that 4 cases of the sprue syndrome maintained in good health on steroids still had gross pathological changes on biopsy.[50] Volwiler[54] considers that oral maintenance therapy with small doses of steroids (e.g. 5-10 mg. of prednisolone daily) is useful and adequate. In his experience relapse commonly occurred 2-3 weeks after stopping treatment. It is not known how steroids produce clinical remission in Whipple's disease and the sprue syndrome; the fact that histological changes persist suggests that there is a non-specific potentiation of fat absorption.

Our patient had not responded to gluten exclusion, but this may not have received an adequate trial; Frazer[21] feels that adult cases of gluten-induced enteropathy may not improve until after 6 months on the restricted diet. However, there is usually a history suggestive of coeliac disease during childhood; as this was lacking here, and steroids had helped her, it was decided not to try the gluten-free diet again. Children with coeliac disease respond rapidly and well to permanent avoidance of gluten.

Adult cases of tropical sprue tend to respond to folic acid; should this fail, broad-spectrum antibiotics may be tried. Antibacterial therapy is not recommended in non-tropical sprue.[21]

Symptomatic treatment demands the oral and parenteral replacement of vitamins and minerals. The absorption of oral supplements of calcium can be aided by concomitant parenteral administration of large doses of vitamin D.[27] Folic acid is the most important haematinic supplement.

SUMMARY

A biopsy-proven case of idiopathic steatorrhoea (non-tropical sprue) is presented. Advances in the aetiology, pathology, diagnosis and management of the sprue syndrome are outlined. It is certain that better understanding of this complicated group of illnesses will follow the recent demonstration of histological changes in the small intestine. While the causes are not all known, the mechanisms of the malabsorption are becoming better understood, and symptomatic control can be expected in a high proportion of cases. Laparotomy may be needed to establish the diagnosis, particularly where the possibility exists that the steatorrhoea may be due to the anatomical 'stagnation syndrome' and thus be amenable to surgical cure.

I wish to thank Dr. Louis Mirvish and Dr. Velva Schrire for permission to report this case and for advice about its presentation. The patient was referred by Dr. L. Sunn. Mr. B. Todt prepared Figs. 1 and 2, and the Department of Pathology, University of Cape Town, provided Fig. 4. I am most grateful to Dr. Margot Shiner, of the Gastro-enterology Department, Central Middlesex Hospital, London, for allowing me to use Fig. 3. Prof. G. C. Linder is thanked for the many investigations performed in his department, especially for the 5-HIAA and d-xylose estimations.

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MEDICAL ASPECTS OF ATOMIC WARFARE*

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In future wars we face the certainty of unconventional methods of warfare, including attack with nuclear weapons. Basically a nuclear explosion is a chain reaction in which matter is converted into energy. The energy which is released creates immediate and residual hazards to life on an unprecedented scale and has consequently given rise to a series of new concepts concerning the medical aspects of nuclear warfare.

Despite the fantastic powers of destruction of nuclear weapons a great deal can nevertheless be done about surviving such an attack provided the population in general and the organized medical services in particular are well informed on what to expect and how to deal with the threat of the various effects of an atomic or thermonuclear bomb attack. In a military sense the hydrogen bomb is just another and bigger weapon designed primarily for its blast effects. Despite its awesome power, its immediate effects are essentially localized, in the sense that it initially effects only a few square miles around the point of detonation. Survival on an individual level is in fact possible, even very close to the bomb's point of detonation, provided reasonable precautions are taken beforehand. A realistic appreciation and knowledge of what the bomb can do and what it cannot do is in fact the first step to survival.

From the strictly medical point of view the injuries sustained by casualties in such an attack are mainly conventional in nature, but are overwhelming in numbers. Injuries are conventional in the sense that like any blast weapon the atomic detonation will occasion a certain energy release, which if inflicted on unprotected human beings will cause the multiple lacerations, haemorrhages, fractures, burns, etc. with which the medical services have become familiar in previous wars. The only additional casualty-producing factor of importance in attacks with nuclear weapons is the matter of ionizing-radiation injuries, but it must be remembered that in the attacks on the Japanese cities of Hiroshima and Nagasaki only approximately 15% of the total casualties were due to this factor.

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The critical problem for the medical organization in nuclear warfare will be the fantastic number of casualties which by sheer weight of numbers will totally disrupt even the most extensive medical organization created to deal with such an emergency. Added to this is the unpleasant fact that when a strategic megaton weapon is delivered on any important population centre it may at the moment of explosion eliminate existing medical facilities, like hospitals and treatment centres, in addition to destroying the transport system. The massive size of the problem is emphasized by the fact that even the relatively small 20-kiloton atom bombs exploded over the Japanese cities were each responsible for between 60,000 and 80,000 casualties. The so-called nominal atomic bombs of 20 kilotons are equivalent in energy but not in effect to 20,000 tons of TNT. They pale into insignificance beside today's 20-megaton hydrogen bomb, where 1 megaton is equal in energy to 1,000,000 tons of TNT. In other words if the equivalent of 20,000 tons of TNT can cause 60,000 to 80,000 casualties, imagine what the equivalent of 20,000,000 tons of TNT will do to any high-density population centre!

In military terms the problem can be stated quite simply. In World War II it took thousands of bomber aircraft 4 years to deliver an estimated 2·3 million tons of TNT. In the next war a single aircraft on one sortie could deliver the equivalent of 10 million tons of TNT. Hence the formula for World War III—one bomb plus one aircraft equals one city.

In medical terms the answer to the problem, at least in part, is the employment of sub-professional personnel—sub-professional in the sense that it includes anybody and everybody inside the medical and allied professions or in any organization outside, or any private individual whatever who has some knowledge or prior training in the principles and practice of life-saving, first-aid techniques or elementary nursing. It is conceivable that in a city demolished by an H-bomb, qualified medical personnel may be eliminated, together with most, if not all, existing medical facilities, so that the casualties cannot depend on being rescued and

given conventional medical treatment by doctors in hospitals. Treatment of mass casualties will for the most part have to be given on the spot by whoever is able to give any treatment whatsoever and not be deferred by hopefully waiting for medical assistance which may not be forthcoming. Great reliance will consequently have to be placed on the services of such sub-professional personnel. The adequate instruction of volunteer aid detachments during peace-time in the special techniques of mass casualty treatment therefore becomes the best possible insurance against a catastrophic fatality rate.

Another new concept in nuclear warfare is that of *triage*, whereby available medical officers will in the first instance be employed in casualty selection, rather than for casualty treatment. With the overwhelming number of casualties expected and the certainty of inadequate facilities and medical supplies, the task of categorizing the casualties into priority groups falls very heavily on the professional personnel. Not only must the doctor distinguish the obviously moribund, but he has to modify normal treatment priorities for other groups of injured by devoting the most of his limited facilities and help to those groups where it will do the most good. These groups may not, however, be the most seriously injured, because in general the prognosis for such cases is uniformly poor. A harsh reality may thus force him to turn from cases which he would otherwise have treated first. This responsibility of deciding who is to fall into this unfortunate group of the 'living dead' and forego other than strictly palliative treatment so that others may live can obviously only be vested in responsible qualified medical personnel. Their task is further complicated by the fact that many of the casualties who may have apparently minor injuries may in fact have absorbed a fatal dose of radiation and are doomed to die days or weeks later.

Whilst the collection and classification of casualties is proceeding under the direction of the medical officer, preliminary treatment must be initiated by the sub-professional personnel to the best of their ability. Only afterwards will the doctor turn to his secondary task of actively treating the casualties. This revolutionary new medical concept is forced on us by the grim realities of nuclear warfare, because when one is faced with anything up to 200,000 casualties in a large city a handful of doctors with limited facilities cannot do very much by themselves, particularly if it is borne in mind that a single surgeon is limited to no more than 12 serious cases per day.

Military medical units are being reorganized to meet the threat of nuclear warfare. In such warfare, no longer would fighting be limited to more or less clearly defined front lines, but nuclear-weapon attacks on strategic areas would involve large sections of the general population. The established evacuation sequence from the regimental aid post at the front lines to the base hospital at the rear will be something of the past and so will the medical field-ambulance units of recent wars. The emphasis will be on highly mobile self-contained casualty collecting and staging units who can be flown into disaster areas in large transport aircraft from the unaffected regions where they are held in reserve. These airborne units are completely self-dependent and are equipped with and capable of erecting and operating thousand-bedded tented hospitals within a matter of 4 hours after their arrival on the scene. These mobile hospitals represent the only practical solution to the problem of providing adequate treatment facilities in disaster areas for the mass casualties of nuclear warfare.

EFFECTS ON MAN OF NUCLEAR EXPLOSIONS

The main characteristics of nuclear explosions may conveniently be dealt with under the headings: (1) flash blindness, (2) thermal effects, (3) blast effects, and (4) ionizing-radiation effects.

1. *Flash Blindness*

The bomb explodes in the shape of a fireball emitting a flash of light of fantastic intensity. An inadvertent glance at the flash will result in a temporary blindness lasting up to 15 minutes. This temporary blindness, although not in itself a serious medical problem, may cause undesirable psychological reactions, particularly if its temporary character and the completeness of recovery have not previously been explained to those affected by it. This temporary blindness may have military significance because the affected men will be unable to defend themselves or move about safely whilst it lasts. Flash blindness cannot be avoided by wearing dark glasses such as would permit daylight vision. Individuals unwise enough to gaze steadily at the fireball may suffer permanent blindness as a result of retinal burns.

2. *Thermal Effects*

The glowing ball of fire emits radiations in the entire electro-magnetic spectrum, including ultra-violet and infra-red. Because of its instantaneous transmission and considerable range, this emission of heat is by far the most potent casualty producing factor; in Japan it was responsible for at least 50% of the total casualties.

Thermal radiation effects are classified according to the mode of production into primary, or flash, and secondary or flame, burn. The clinical manifestations of these burns, however, are in all respects, similar to those caused by conventional high-explosive weapons and do not demand other than conventional treatment. The severity of the flash burns are directly related to the distance from the explosion and to the existing atmospheric conditions, but they are modified by shielding and shading of interposed structures and by the angle of incidence. It has been determined that for a nominal 20-kiloton weapon exposure of the skin to 3 calories per sq. cm. at approximately 4,000 yards will result in second-degree burns, whilst an increase in incident thermal energy to 5¼ calories per sq. cm. at 3,000 yards will result in third-degree burns. The thermal energy varies with the total weapon yield, so that with a 1-megaton weapon, for instance, third-degree burns will be sustained up to 14,700 yards from ground zero. In other words, the H-bomb has a scaling factor of approximately 11 in relation to the A-bomb.

Secondary, or flame, burns are caused by actual burning of the clothing. Dark-coloured clothing absorbs heat and transmits it to the body, or bursts into flame. It is to be noted that 9 calories per sq. cm. is required to ignite cotton and 14 calories per sq. cm. to ignite wool. In Japan these secondary burns were responsible for many fatalities, especially in casualties who were so injured by secondary blast effects that they could not escape.

The treatment of burns will undoubtedly be the biggest problem for the medical services immediately after a nuclear

attack, because burn treatment requires a high level of surgical and nursing skill and because it necessitates the extravagant use of sterile and other dressings, which will most certainly be in desperately short supply. Unshielded persons will sustain a large number of burns, involving exposed body surfaces, particularly the hands and the face. This is particularly significant from a military point of view as such troops so affected will be unable to handle their weapons for periods from days to weeks. Initial treatment should consist of occlusive sterile dressings and sedation as required and available. The important life-saving consideration is the evacuation to medical facilities like the thousand-bedded emergency hospital mentioned above where surgical techniques and extensive supportive fluid replacement treatment is available. Treatment in such medical units will be required for burns involving more than 18% of the total body surface in adults or more than 5% in children or more than 9% in the aged. For lesser burns treatment will of necessity have to be on a self-help or mutual-aid basis. Extensive research is in fact being conducted for the development of such self-treatment methods and materials which will lead to efficient mass therapy.

In Japan, lack of adequate treatment led to improper healing of burns, and common sequelae were contractures and keloid formation. Such contractures are, however, by no means a particular feature of atomic burns, and keloid formation is more likely a function of pigmentation than exposure to atomic flash.

3. *Blast Effects*

Blast effects are also divided into primary, or direct, blast effects and secondary, or indirect, effects which are mainly due to flying debris behaving like dangerous, secondary missiles. In Japan, blast effects were responsible for an estimated 35% of the casualties but, contrary to expectation, the primary blast effects have but little significance as a casualty-producing factor. It has been determined that the primary shock wave lasts for approximately one second, which is much longer than with conventional high-explosive weapons. The shock wave thus becomes in effect an extremely violent wind, having an initial velocity in excess of 700 miles per hour. A nominal atomic bomb explosion will produce peak overpressures in excess of 3 p.s.i. up to 1½ miles from ground zero, which is enough to demolish all ordinary residential constructions. However, pressures in excess of 100 p.s.i. are required to cause significant internal blast damage to the human body but, with a nominal atomic bomb such primary blast pressures are not attained even at ground zero.

The secondary blast effects, however, are prodigious casualty-producing factors, particularly in built-up areas where masonry, glass, and virtually every displaceable object, will be blasted to speeds of 700 miles per hour, so causing multiple contusions, lacerations and fractures. Once more, the injuries are conventional and the treatment is largely conventional, but the fantastic number of casualties and the number of such injuries to individual casualties are on a scale seen only in this type of disaster. The only additional points for consideration are the possibility of concurrent radiation injury and its effects on priorities and prognosis and the possibility of contamination of wounds with radio-active material, which must first be detected and then removed by excision.

4. *Ionizing-Radiation Effects*

The only factor not present in the high explosive weapon is that of radiation. The effects of ionizing-radiation injury in the attacks on Hiroshima and Nagasaki were directly responsible for less than 10% of the total casualties. Despite its statistically minor role, radiation effects nevertheless warrant extensive investigation, both because of the fact that ionizing radiation complicates an estimated 25% of blast and heat injuries, and because of the profound reaction, both mental and physical, of casualties to the immediate and the residual effects of radiation.

Various types of ionizing radiation are given off at the moment of detonation of a nuclear weapon and continue to be emitted by the radio-active substances inside the characteristic mushroom cloud. Of these electro-magnetic emissions, gamma rays with their very short wave-length and high penetrative power, plus the shower of spare neutrons travelling at high speed, are the most important in causing ionizing-radiation injury.

These initial radiation effects are however strictly localized to the area surrounding the bomb burst. Following a nominal A-bomb explosion no immediate radiation effect is transmitted further than approximately 2,000 yards from ground zero. Although the intensity of radiation will cause 100% fatal casualties up to approximately 1,200 yards, the thermal effects of an A-bomb will cause 100% fatal casualties up to approximately 1,400 yards, so that for the exposed personnel the additional hazard of a fatal dose of radiation at ranges of less than 1,400 yards is of academic interest only. A significant number of initial radiation casualties will thus be caused mainly in a narrow zone between approximately 1,500 and 2,000 yards. The same relation holds good for the larger megaton weapons, where the combined effect of heat and blast will ensure destruction of a target and 100% fatal casualties at ranges far exceeding that attained by immediate nuclear radiation.

The residual radiation effects arising from within the contaminated area of the bomb burst, and as a result of the fall-out phenomenon, constitute a much more formidabie hazard. This is not only because it extends further afield, but also because, in addition to gamma rays, the unfissioned weapon material produces alpha particles with a very long half-life, and the fission products, which constitute approximately 200 artificial radio-active isotopes, produce beta particles. The radio-active substances which rush upwards in the atomic cloud may be either dispersed or diluted in the upper atmosphere so that no serious hazard results, or they may be deposited at varying distances down-wind from the site of the explosion, producing a further contamination hazard, mainly from the alpha- and beta-emitting dust. The fall-out dust has a short range and poor powers of penetration and is therefore not an important external hazard, but it is a vitally important internal hazard when it comes into intimate contact with the tissues.

Ionizing-radiation injury to the tissues, whether caused by immediate or residual radiation, depends basically upon the absorption of the energy of the radiation concerned by the tissues exposed. This transfer of energy occurs as a result of ionization, although the exact biophysical and biochemical reactions have not yet been satisfactorily delineated. Although gamma rays, and alpha and beta particles, and neutrons, each produce ionization by different mecha-

nisms and to different degrees, the end result of the energy absorption is destruction of the tissues involved. This is not specific for any given type of radiation, or even for radiation itself. The destructive effect depends on the relative radio-sensitivity of the tissues involved. In general a great radio-sensitivity is found in tissues which are relatively unspecialized or exhibit rapid multiplication and active reproduction, whilst highly differentiated tissues and those in a quiescent state of development are relatively radio-resistant.

The degree of radiation injury depends not only on the total dose and on the dose rate, but it also involves the spatial relationship between the tissue and the radiation source; in other words, the range, penetration and absorption of the various emissions. For example, alpha particles produce intense ionization, but their range is such that they are stopped by the cornified layer of the skin and they thus present no external hazard. But if they are ingested or inhaled and subsequently deposited near vital tissues, their short-range emissions cause considerable long-term damage. High-energy gamma rays, on the other hand, have far less ionizing power than alpha particles, but their high powers of penetration make gamma emitters the major external hazard.

Clinically, the ionizing radiations give rise to the symptom complex of radiation sickness. Following exposure to acute radiation the symptoms of anorexia, nausea and vomiting usually appear after a variable period of hours, depending on the dosage received. These primary effects last 2-3 days before resolving spontaneously. A second latent period then intervenes and the casualty may feel no apparent ill-effects for a matter of days before the symptoms of the secondary effects supervene. This latent period is inversely proportional to the degree of radiation exposure and is a good clinical yardstick for the ultimate prognosis of the individual concerned. With lethal doses the latent period may become very short or even disappear, and death may occur before the full picture of radiation sickness develops. The secondary effects, which may be delayed for more than 2 weeks, similarly commence with anorexia, general malaise, nausea, vomiting and diarrhoea. Soon epilation starts, followed by mucosal ulceration and the secondary haemorrhages of a profound aplastic anaemia. The blood picture shows a progressive lymphocytopenia, accompanied by a simultaneous granulocytic leucocytosis, a reduction in the platelet count, and diminished erythrocytes.

At this stage the condition either goes into the terminal phase and death follows a period of hyperpyrexia and secondary infection, or a very slow recovery takes place, complicated by a 10% residual effect and a higher susceptibility to pathological changes.

The severity of radiation sickness naturally depends directly on the dosage absorbed. If from 50 to 200 r. are absorbed only mild symptoms will develop, several days afterwards, and it will not kill. Dosage between 200 and 500 r. cause moderate to severe symptoms to develop after a few hours. A dose of 200 r. moreover, is regarded as a critical dose which, if complicated by heat and blast injury, will give the individual a poor prognosis. At 450 r., 50% fatal casualties are to be expected. In the third dose range —from 500 to 700 r.—hyperacute symptoms will develop. In fact, above 600 r., 100% fatal casualties will occur within 10 days.

Whilst the genetic effects of immediate radiation have undoubtedly been over-emphasized, the probability of producing a mutation with a single ionizing exposure does nevertheless exist.

Besides these initial radiation effects at the time of the bomb burst, prolonged exposure to the effects of residual radiation may have equally serious and fatal results. The fall-out area of a 10-megaton hydrogen bomb will extend down-wind for approximately 250 miles and anybody exposed continuously for 36 hours in the open will receive a radiation dose varying from 5,000 r. 10 miles from ground zero, to 300 r. at 200 miles. In addition to the obvious danger of exposure in a contaminated area down-wind from the explosion, the undetectable inhalation or ingestion of radio-active particles deposited by the fall-out phenomenon on a world-wide scale following a high yield thermo-nuclear explosion represents a critical problem for virtually everyone on earth.

More than 200 radio-active isotopes are produced in every nuclear explosion, and all are potentially harmful. They range from the short-lived isotopes like iodine-131 and strontium-89, with a half-life of a few days, to caesium-137 and to strontium-90, which has a half-life of 28 years. Although none of these artifically radio-active isotopes existed in the pre-atomic age, it is a disturbing thought that following nuclear test explosions their distribution is today universal, and traces are to be found in the bodies of virtually all human beings.

Long-lived strontium-90, a beta-emitter, is particularly feared, because of its high yield in atomic explosions, its long biological half-life of 7½ years, and the fact that, like calcium, it enters the soil-plant-human cycle and is subsequently deposited in bone. Here its beta-particle emissions may cause bone tumours and sarcomas, as well as leukaemia. A recent American survey by Kulp *et al.* for the U.S. Atomic Energy Commission showed that present-day human beings had an average of 0·12 micromicrocuries per g. of body calcium, and that it was expected to reach an ultimate concentration of approximately 2 micromicrocuries in the foreseeable future if nuclear test explosions proceed at the present rate.

The critical problem facing us is to assess the extent of the hazard represented by any given amount of strontium-90 in the bone. It has been determined that, for people occupationally exposed to radiation from radium sources, the maximum allowable body burden of strontium-90 is 1,000 micromicrocuries, which is 500 times the average dose resulting from the test explosions. If such a dosage holds true for radio-active strontium-90 from the nuclear bomb explosions, there does not appear to be much cause for alarm. But it must be borne in mind that the allowable exposure level must be considerably lower for the foetal, neonatal and adolescent elements, who are far more sensitive to the detrimental effects of radiostrontium than the general population.

Divergent views are at present held by eminent authorities on this problem. Some incline to the view that a threshold value exists for the concentration of strontium-90, giving it a safe latent period, whilst other equally well-known authorities regard the formation of malignancy in bone as a linear function of radiation dosage. If there is such a threshold level for the carcinogenic effect of strontium-90 deposited in bone, then it is reasonably safe to predict that the relatively low levels which will accumulate in bone as the result of current hydrogen-bomb tests will not be deletrious, seeing that it represents approximately only 1/500th of the maximum

permissible body burden of radiostrontium. On the other hand, if one takes the worst possible view and regards the dosage and effects as bearing a linear relationship, so that each unit quantity of strontium-90 absorbed will confer a certain probability of bone-tumour formation, the position is indeed serious. It has, for instance, been calculated that if this is the case one high-yield magaton explosion may result in the ultimate formation of 20,000 bone sarcomas throughout the world.

The generally accepted view is that in the present state of knowledge any such theories are to be accepted only with reservation. However, Dr. Masao Tsuzuki, Director of the Red Cross Central Hospital, Tokyo, echoes the views of many medical men when he says: 'I do not believe that strontium-90 will be permanently harmful at its present level, but if experimental explosions continue at the present rate, there will come a time when the human body will be seriously harmed. It will then be too late to do anything about it!'

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FLUOTHANE ANAESTHESIA IN INFANTS AND CHILDREN

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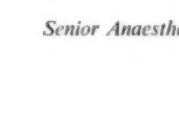
Fluothane is the trade name of the new volatile anaesthetic agent trifluorochlorobromethane (halothene).



From its structural formula, it will be seen that it is a derivative of ethane with 3 hydrogen atoms substituted by fluorine, 1 by bromine and 1 by chlorine. It is non-explosive and non-flammable both as a liquid and vapour mixed with oxygen, air or nitrous oxide. Fluothane is a clear, colourless liquid with S.G. of 1·86 at 20°C and boiling point of 51°C. The odour is sweetish, not unpleasant and completely non-irritating.

Some pharmacological actions of Fluothane have been described by Raventos[1] and more recently by Burn *et al.*[2] in a report to the British Medical Research Council. Several reports[3-12] on its use in clinical anaesthesia have appeared since December 1956. From these reports, mainly of its use in adults, it appeared that Fluothane might offer certain advantages in the field of paediatric anaesthesia, particularly in respect of the non-irritating properties of its vapour, ease of induction and speed of recovery and the reported absence of nausea and vomiting on recovery, although this latter finding was not consistent.

In the present trial, Fluothane was administered to 200 children, either as the principal anaesthetic agent (150 cases) or as an agent for induction before maintenance of anaesthesia with di-ethyl ether (50 cases). The age of the patients (Table I) varied from 2 days to 11 years. Patients were entirely unselected as far as pre-operative condition was concerned and included 1 case of bilateral acute lobar pneumonia, 4 cases of tracheotomy for severe respiratory distress, 2 cases of very severe toxaemia due to acute osteitis, and several asthmatics. Repeated anaesthetics with Fluothane were received by 12 patients, 2 of these on 9 occasions at weekly intervals. The type of surgery carried out is indicated in Table II.

TABLE I. AGE DISTRIBUTION OF CASES RECEIVING FLUOTHANE AND FLUOTHANE-ETHER SEQUENCE

Age	*Fluothane*	*Fluothane-ether*
0–2 weeks	6	2
2 weeks–1 year	20	8
1–5 years	66	21
5–11 years	58	19
Total	150	50

TABLE II. DISTRIBUTION OF CASES ACCORDING TO TYPE OF SURGERY

Type of Surgery	*Fluothane*	*Fluothane-ether*
Intra-abdominal	20	8
E.N.T...	25	14
Plastic	21	3
Eye	5	0
Hernia..	42	13
Urological	6	1
Other	31	11
Total	150	50

Premedication in all cases consisted either of pethidine and atropine or atropine alone given by intramuscular injection 1 hour before anaesthetic. The dose of pethidine was strictly according to body weight (0·5 mg. per lb.).

The dose of atropine was 1/300 gr. for children under 2 months of age, 1/200 gr. from 2 months to 1 year, 1/150 gr. from 1 year to 5 years and thereafter 1/100 gr. It was decided in view of the stress laid on the use of atropine with Fluothane by Michael Johnstone, to depart from our usual practice in omitting it from premedication in very small infants.[13]

ADMINISTRATION

Previous experience by one of us (A.B.B.) in the administration of Fluothane to dogs during its preclinical investigations, and the reports of clinical trials by others, have given a clear indication of the extreme anaesthetic potency of Fluothane vapour. This makes it important to ensure accurate measurement of vapour concentration in inhaled mixtures. At present, two types of apparatus are available for accurate administrations of known concentrations of Fluothane vapour within a wide range of temperatures and rates of flow. These are the Fluotec vaporizer[10] and the E.M.O.[14] Fluothane inhaler. Both are compensated for changes in ambient temperature and for change in temperature of liquid within the vaporizer caused by evaporation, and will deliver accurate vapour concentrations over a sufficiently wide range of flow rates for all clinical purposes. A third type of vaporizer is also available in the form of a modified Trilene bottle of the standard type found on the Boyle apparatus. This, however, is not temperature compensated and, in practice, wide variations in Fluothane concentrations are likely to be encountered in the use of this apparatus. In this series of cases the Boyle-type bottle was used on some 15 cases and then abandoned owing to marked temperature changes in the Fluothane caused by evaporation, leading to gross inaccuracy of delivered vapour concentration. In the remainder, Fluothane was administered from the Fluotec vaporizer or the E.M.O. in a vehicle of N_2O and O_2, O_2 alone, or air. It must be noted that internal resistance in the Fluotec inhaler is too high to permit its use as a 'draw over' inhaler and that when used with air, a means of delivering air through the vaporizer must be employed. The E.M.O. is so constructed that internal resistance is negligible at all concentrations and can be used as 'draw over'.

INDUCTION

It was found that patients became unconscious after 2-3 minutes' inhalation of 1·5-2% Fluothane vapour. A very characteristic pattern of events occurred during this induction period, the salient points of which were as follows: (1) There was no objection to inhaling the mixture that could be attributed to unpleasant odour or irritation. (2) A tranquil state was reached very rapidly—usually in the first minute—in which all signs of apparent nervousness, when present, disappeared, yet consciousness and, in older children, ability to converse intelligently, remained unimpaired. (3) Following this tranquil state, there appeared a very brief stage, lasting only a few seconds, which could be construed as 'second stage' anaesthesia. (4) This was followed by very rapid loss of consciousness and the appearance of profound relaxation during the 2nd or 3rd minute of inhalation.

This stage of loss of consciousness was accompanied by a definite fall in blood pressure which averaged 25 mm. Hg, and an obvious decrease in amplitude of respiration and slight increase in rate. In 4 cases in which respiratory minute volume was recorded, this drop amounted to as much as 50% of normal. This state of profound relaxation and shallow breathing was found to be most misleading and any pain stimulus applied, immediately produced brisk movement on the part of the patient, a rise in blood pressure to near pre-anaesthetic level, and an increase in amplitude of respiration.

Most striking, however, was that at this stage, after some 3 minutes of inhalation of 1·5-2% vapour, laryngoscopy could be performed with ease. The jaw was very relaxed and the vocal cords wide open. Stimulation of the pharynx by the laryngoscope, however, or an attempt to pass an endotracheal tube, resulted in closure of the cords and a cough or series of coughs which seemed to be fully coordinated and not at all in the nature of a 'spasm'. Withdrawal of the stimulus was rapidly followed by the return of rhythmical respiration, and in only one case did we experience anything that could be termed 'laryngeal spasm' during induction, in spite of repeated deliberate attempts to produce one. Continued stimulation of the larynx did sometimes provoke breath holding.

To provide conditions satisfactory for endotracheal intubation without provoking coughing, we found it necessary either to apply topical anaesthesia to the larynx at an early stage, say after about 3 minutes, or to continue giving 2% vapour for a full 10 minutes. This period of 10 minutes was also found to be the average time necessary before surgical stimulus could be applied without causing the patient to move; it provided satisfactory operating conditions for all extra-abdominal procedures. Relaxation, however, was frequently not sufficient to permit all intra-abdominal procedures.

MAINTENANCE OF ANAESTHESIA

Fluothane was used as the agent to maintain anaesthesia in 150 cases. After induction as outlined above, it was found that the application of the stimulus of surgery caused a rise in blood pressure from the earlier fall to within 10 mm. Hg. of the level before anaesthesia. This frequently continued for the duration of the operation, especially if adequate anaesthesia could be maintained with concentrations of Fluothane not exceeding the region of 1%. This concentration was found satisfactory for most extra-abdominal procedures, although it was sometimes necessary to maintain concentrations of up to 2%.

For abdominal operations requiring much relaxation 2% Fluothane was not always adequate. Increase in Fluothane concentration did improve relaxation but the increased depth of anaesthesia was invariably accompanied by marked decrease in respiration and fall in blood pressure to levels as low as 80 mm. Hg. We feel that where relaxation with 2% vapour alone is inadequate, it is preferable either to resort to the use of muscle relaxants to provide the desired degree of relaxation or to change over to ether for maintenance. In this series 20 cases received muscle relaxants, succinyl choline being used 15 times and gallamine 5 times. When a relaxant was used, Fluothane concentration was decreased to 1%, and under these circumstances we noticed no major alteration in blood pressure provided that meticulous attention was paid to maintaining blood volume. In the cases which received gallamine, neostigmine preceded by atropine was used at the end of operation. This too was followed by no untoward circulatory changes. We do feel,

however, in the light of reports on the 'vagotonic' action of Fluothane that neostigmine should be used with caution and that elimination of Fluothane should be allowed to take place as far as possible before neostigmine is given.

RECOVERY

The return of consciousness in all cases was rapid. After short periods of anaesthesia, lasting up to 20 minutes, consciousness returned within 5-7 minutes. After longer periods return of consciousness was delayed up to 10 minutes and occasionally to 15. This recovery time was seldom exceeded even after operations lasting up to 3 hours, except where there had been very extensive surgery or doubt about adequacy of blood replacement. The nature of the recovery was striking in that protective reflexes returned early and mental alertness was regained very rapidly. It was not uncommon to find patients after operations which produced minimal post-operative pain sitting up, fully alert, within 10 minutes of leaving the operating table. The most notable feature in recovery was the almost complete absence of nausea and vomiting. Only one case in the series receiving Fluothane as the sole or principal anaesthetic vomited during recovery. This patient, who had an appendicectomy, was also the only patient in the series to receive a dose of pethidine in excess of 0·5 mg. per lb. as premedication. He, in fact, received 1 mg. per lb. As important as the absence of actual vomiting is the absence of nausea. No indication of post-recovery nausea was encountered.

Generalized shivering was noticed frequently during the early stages of recovery. No accurate record of the incidence of this was kept but some degree of generalized shivering lasting for ½ -1 minute was noticed in the majority of cases. In 2 cases shivering was violent and lasted for 3-4 minutes.

FLUOTHANE-ETHER SEQUENCE

In 50 cases anaesthesia was induced with Fluothane at 1·5-2% concentration as described above, anaesthesia being maintained thereafter with N_2O, O_2 and ether. In these cases the initial fall in blood pressure and decrease in respiratory amplitude was noticed but there was a return to normal levels within 2 minutes of change-over from Fluothane to ether. Thereafter the picture remained as usually seen with ether anaesthesia. The following observations were made:

1. Change-over to ether after 3-4 minutes of 1·5-2% Fluothane was not associated with laryngeal spasm or coughing, even when ether was introduced abruptly. For example, it was possible to move the ether control on the standard Boyle's bottle from closed to full-open in a matter of 10 seconds.
2. Recovery in this series was not accompanied by the shivering seen with Fluothane alone.
3. Vomiting during recovery was seen in 10 cases.
4. Return of mental alertness was as is usually seen after ether anaesthesia.

COMMENT

Fluothane is an extremely potent anaesthetic agent, inhaled concentrations of 1-2·5% being sufficient to provide anaesthesia for almost all surgical procedures in children. Succinyl choline and gallamine can be safely employed to procure added relaxation with low concentration of Fluothane, should this be necessary.

The non-irritant properties and not unpleasant smell, the speed and smoothness of action, offer distinct advantages over other inhalation agents as a method of induction in paediatric anaesthesia.

Rapid recovery and quick return of mental alertness and in particular the striking absence of nausea and vomiting are of inestimable value both from the point of view of general comfort and especially for the safety of the patient. We have found this particularly so in those plastic and orthopaedic cases where fixation posture makes vomiting during recovery hazardous in the extreme. This rapid recovery, however, carries the disadvantage of rapid awareness of post-operative pain and it is notable that Fluothane appears to provide little or no residual analgesia. Care must therefore be taken in the judicious and fairly early use of post-operative analgesics to avoid restlessness and distress due to pain. To attempt to cover pain during the recovery period by the use of heavier premedication may be dangerous because it is likely to increase the respiratory depression during anaesthesia.

Fluothane is non-flammable and non-explosive and so has the advantage of being usable with impunity in the presence of diathermy.

The method of administration is simple and Fluothane can be administered in air or with N_2O-O_2 mixtures. Its extreme potency, however, demands accurate control of vapour concentration and, whilst its use on an open mask[4] and in closed circuit apparatus[7] has been described, we feel very strongly that there is a very real danger of delivering unknown concentrations which may become dangerously high. Changes in concentration of as little as 0·5% V/V cause marked changes in depth of anaesthesia.

Hazards

Against these advantages which Fluothane offers in clinical use, must be set the various hazards which may be encountered in the present state of our knowledge of this drug. In this respect, respiratory depression and hypotension stand foremost.

Respiratory depression carries with it the risk of hypoxia and carbon-dioxide retention. The former, it is true, may be largely compensated for by administering Fluothane in an oxygen-rich mixture, and when this is done clinical manifestations of hypoxia are absent. Administered in air, however, signs of anoxia advancing to definite cyanosis are sometimes seen. Carbon-dioxide excess can of course occur during administration both in oxygen-rich atmosphere and in air, and both this and anoxia sometimes have adverse effects on the cardio-vascular system. During Fluothane anaesthesia, however, respiration can be assisted or even fully controlled with great ease provided normal airway precautions are observed, and in this way the disadvantage of respiratory depression may be overcome. The detection of what constitutes an undesirable degree of respiratory depression, on the other hand, is more difficult to assess accurately unless one has facilities for continuous measurement of respiratory exchange. In the absence of such facilities, one must rely on clinical acumen and experience. We feel that respiratory depression during Fluothane anaesthesia must be looked for most carefully at all times and that it is wiser to err on the side of over-ventilation by assisting respiration when in any doubt than to risk insidious hypoxia and hypercarbia by permitting spontaneous respiration of

questionable adequacy to persist. In this connection too, it is important to choose premedication so that it will not aggravate respiratory depression.

Hypotension. The mode of production of the fall in blood pressure during the administration of Fluothane is by no means clear. Animal experiments[2] suggest that depression of the central vasomotor mechanisms plays a part and that there is some reduction in cardiac output. The extent to which these factors operate in the intact human subject has not yet been determined. Clinical reports have shown that the hypotension is easily reversible by pressor drugs, but whether it is necessary to employ them by routine is questionable and the degree of hypotension must be taken into consideration. The clinical picture of hypotension under Fluothane anaesthesia is one of a warm, vasodilated patient with good peripheral blood flow. In the non-atropinized patient, there is also bradycardia and the blood pressure falls to lower levels than in the atropinized subject. The picture in fact resembles what has been described as neurogenic hypotension. It is most important, however, to note that in this state, blood loss will not be compensated for by normal physiological mechanisms and blood lost during surgery under Fluothane anaesthesia must be replaced with the same care as during spinal anaesthesia. This is doubly important in infants and children, where initial blood volume is small and small amounts of blood lost comprise a relatively large proportion of circulatory blood volume. The degree of hypotension becomes increasingly severe with administration of increasing concentrations of Fluothane but in this series we have not encountered pressures below 90 mm. Hg if concentration of 2% is not exceeded. We hesitate to say that the hypotension can be ignored unless severe, but in this series it has not given cause for alarm and, provided blood volume was replaced to keep pace with blood loss, return of blood pressure to pre-operative levels occurred promptly when Fluothane administration was stopped. The mechanism of production of the hypotension, however, requires further investigation and, in view of the suspicion that diminished cardiac output may play a part, it must be viewed with caution.

No studies of renal or hepatic function from which conclusions can be drawn were undertaken in this series. Creatinine clearance and inulin and P.A.H. clearance performed on two cases, however, suggests that the effect of Fluothane on glomerular filtration rate and renal plasma flow is similar to that seen with other general anaesthetic agents.

CONCLUSION AND SUMMARY

The use of Fluothane as the anaesthetic in 200 operations on children is described and discussed. We feel that Fluothane offers distinct advantages as an induction agent in paediatric anaesthesia and that the striking absence of vomiting during recovery found in this series can be of great value. The rapidity and mode of recovery too make it an admirable agent for out-patient use. The respiratory depression and cardiovascular effects seen, however, are of such a nature that further investigation is most desirable. Great care in administration is necessary at this early stage in knowledge of the pharmacological action of Fluothane and we feel it is important to use an accurately calibrated vaporizer for administration.

We wish to thank Dr. J. F. W. Mostert for permission to publish the results of this series of cases. Messrs. I. C. I. Pharmaceuticals have made generous supplies of Fluothane available. We also wish to thank our surgical colleagues for their patience and cooperation while we were using this anaesthetic.

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DIE VERPLEGING VAN GEESTESGEBREKKIGES: ENKELE ASPEKTE

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Die doelwit met hierdie studie is om 'n beknopte daarstelling te bied van enkele aspekte van die verpleging wat geïnstitueerde geestesgebrekkige persone verg. Ons wil eers die voorkoms van die onderskeie siekteverskynsels, wat aandag en verpleging geniet, in breë trekke kwantitatief vasstel; nie alleen omdat dit intrinsiek wetenswaardig is nie, maar veeleer omdat dit van belang behoort te wees wanneer 'n aanbeveling gedoen word om 'n kind na 'n inrigting te neem, deurdat dit insiggewend is vir die verpleging en versorging wat dit daar te wagte staan, veral ten opsigte van die minder belangrike aandoenings. Dan wil ons ook onderneem om in breë trekke vas te stel of daar enige geslagsverskille is, of daar enige verband tussen siekteverskynsel en die graad van geestesgebrek is, en of enige praktiese gevolgtrekkings hiervan afgelei kan word.

Die ondersoek is aan die Alexandra-Inrigting vir Swaksinniges gedoen, een van 3 sulke tehuise onder die Gesondheidsdepartement van die Unie van Suid-Afrika. Dit word as hospitaal bestuur, en die personeel is hoofsaaklik geneeshere en opgeleide verpleegkragte. Dit is in 12 afdelings verdeel, elk onder 'n suster, bygestaan deur verpleegsters. Daar is 'n apteker en 2 matrones. Die geneesheer-bestuurder en 2 geneeshere hou algemene toesig en is verantwoordelik vir die mediese behandeling. 'n Tandarts doen weekliks diens, en verder is daar onbeperkte geriewe om spesialiteite in te roep en buitemuurse mediese dienste in te span, wat

TABEL I. VERWYSING VAN INDIVIDUELE PASIËNTE—829 GEVALLE

Getal Pasiënte	*Getal Besoeke*	*Gemiddelde Getal Redes*
7	30—34	11
13	25—29	8
27	20—24	8
66	15—19	6
169	10—14	5
274	5—9	4
273	1—4	2

dan ook ruimskoots gedoen word; so bv. word pasiënte na Groote Schuur-Hospitaal verwys, en groot operasies word in die Rondebosch- of Conradie-Hospitaal gedoen.

Die mediese beamptes besoek daagliks hul onderskeie afdelings en sien o.a. die verslae van die verpleegpersoneel na. Gevalle van siekte of enige aandoening word sonder uitsondering na 'n sentrale kliniek verwys, waar hulle medies ondersoek, en voorskrifte vir hul behandeling uitgereik word. Ernstige gevalle word vir intensiewer verpleging in 'n siekeafdeling opgeneem. Vir elke pasiënt is daar 'n mediese kaart in die kliniek, waarop die datum en besonderhede van elke besoek aangeteken word. Slegs een van die mediese beamptes behartig die werk in die kliniek en siekeafdeling.

Ons algemene metode was om al die siektegevalle wat binne 'n tydvak van 30 maande, Januarie 1954 tot Junie 1956, na die kliniek verwys was te klassifiseer en tabuleer. Dr. E. F. M. Terblanche, M.B., Ch.B., die mediese beampte wat die werk in die kliniek doen, het spesifiek vir hierdie ondersoek al die redes waarom pasiënte na die kliniek verwys is, geklassifiseer, sodat ons oor nagenoeg eenvormige behandeling van ons gegewens beskik. Manlike en vroulike pasiënte is afsonderlik behandel, en die IK's is aangeteken. By die behandeling van die groot hoeveelheid gegewens wat ingesamel is, sal ons ons tot 'n minimum statistieke besonderhede beperk. Die erlangde tabelle behoort om teen die agtergrond van Tredgold se bevinding beskou te word, dat dit van geestesgebrekkiges oor die algemeen beweer kan word, selfs in die modernste en bes bestuurde inrigtings, dat hul fisiologiese speling en weerstandsvermoë beslis benede normaal is, met die gevolg dat hulle buitegewoon vatbaar vir siekte is.[1]

TABEL II. VERSPREIDING VAN 6629 VERWYSINGS

Rede vir Verwysing	*Manlik*		*Vroulik*		*Totaal*	
	Getal	*%*	*Getal*	*%*	*Getal*	*%*
1. Geringe beserings ..	647	24·2	891	22·5	1538	23·2
2. Huidsiektes	812	30·4	687	17·4	1499	22·6
3. Tande	317	11·9	597	15·1	914	13·8
4. Asemhalingstelsel ..	207	7·7	435	11·0	642	9·7
5. Spysverteringstelsel ..	210	7·9	327	8·3	537	8·1
6. Oor, neus, keel ..	141	5·3	315	8·0	456	6·9
7. Oë	79	3·0	111	2·8	190	2·9
8. Niks abnormaals gevind	42	1·6	105	2·7	147	2·2
9. Spierstelsel	14	0·5	129	3·3	143	2·2
10. Bloedvaatstelsel ..	63	2·4	71	1·8	134	2·0
11. Senustelsel	21	0·8	58	1·5	79	1·2
12. Bene, gewrigte	18	0·7	58	1·5	76	1·1
13. Besmetlike siektes ..	32	1·2	43	1·1	75	1·1
14. Gewigsverlies	16	0·6	33	0·8	49	0·7
15. Voortplantingsorgane ..	9	0·3	39	1·0	48	0·7
16. Gewasse	13	0·5	16	0·4	29	0·4
17. Ernstige beserings ..	12	0·4	11	0·3	23	0·3
18. Urinestelsel	8	0·3	8	0·2	16	0·2
19. Ander siektes	13	0·5	21	0·5	34	0·5
Totaal ..	2674		3955		6629	

Indrukwekkende individuele verskille ten opsigte van beide die getal verwysings van pasiënte na die kliniek, sowel as die redes daarvoor, het aan die lig gekom. Die erlangde gegewens verskyn onder Tabel I. Ons 829 gevalle het altesaam 6,629 besoeke afgelê, gemiddeld 8 per individu; 122 het vir 1 rede gegaan, 1 waarvan 24 maal vir dieselfde rede. Die helfte het vir 4 of meer redes gegaan; 118 het vir 7-15 redes gegaan. Een het 33 besoeke afgelê vir 15 verskillende redes, almal eg en gegrond. Tabel II bied die verspreiding van ons 6,629 verwysings onder die verskillende siektes.

Ons 2 tabelle moet ook in die lig van die volgende basiese gegewens gelees word:

Kronologiese Ouderdomme. Op 30 Junie 1956, die laaste dag van ons ondersoek, was die mediaan ouderdom van die pasiënte 29 jaar. Die omvang was 0-80 jaar, die interkwartiele-omvang was 18½ tot 43 jaar; 40 (4·7%) was 60 jaar en ouer, terwyl 116 (13·8%), 50 en ouer was. Daar was 57 (6·7%) kinders onder 10 jaar, en 245 (28·9%) onder 20.

Ouderdomme tydens Toelating. Die gemiddelde ouderdom waarop die pasiënte in die inrigting opgeneem was, was 17 jaar. Die helfte was 8-20 jaar oud; 100 (11·8%) was onder 5, 289 (34%) onder 10, en 74 (8·7%) was 30 jaar en ouer.

Verblyfperiode. Die gemiddelde verblyftyd in die inrigting was 16 jaar, die interkwartieleomvang hiervan was 7-26 jaar, en 229 (27%) was 25 jaar en langer in die inrigting.

Intelligensie. Wat verstandelike vermoëns betref, was 287 (33·9%) idiote met IKs 0-24; 335 (39·6%) was imbesiele met IKs 25-49, en 225 (26·7%) was morone met IKs 50-80.

Daar is geringe, ofskoon nie wesenlike geslagsverskille in hierdie gegewens; die gemiddelde getal pasiënte op die register was 847, 356 (42%) manlik en 491 (58%) vroulik.

In ons ondersoek wil ons die aandag hoofsaaklik op die statistieke sy, t.w. die voorkoms van die siektes spits. Vertolking van hierdie gegewens val grotendeels buite ons bestek; maar om misleidende indrukke te voorkom sal enkele, algemene beskouinge tog veroorloof wees.

Geringe Beserings. Die voorkoms van geringe beserings, huidsiektes en tandheelkundige gevalle is hoog; die 3 beslaan 3,951 (59·6%), meer as die helfte van die totaal verwysings. Geringe beserings is die hoogste, met 1,538 (23·2%); maar persone met ervaring van swaksinniges sal nie hieroor verbaas wees nie, iets wat byna vanselfsprekend is, veral onder idiote en imbesiele. Oningeligte persone kan egter verkeerdelik vermoed dat die pasiënte mekaar onderling beseer, maar dit is selde die geval; verreweg die meeste beserings word self toegebring; so bv. beseer epileptici hulself, ander val of stamp of krap hulself, ens. Ouers van geestesgebrekkige kinders besef terdeë hoe maklik ligte beserings opgedoen word, en tuis is daar veel meer kanse hiertoe as in 'n moderne inrigting. Dit beteken nie dat geringe beserings so buitegewoon veelvoorkomend is nie, maar wel dat dit sulke oormatige, nougesette aandag aan die kant van die mediese beamptes en die verpleegpersoneel geniet.

Ernstige Beserings. Wat wel verbasing wek is die geringe getal ernstige beserings, slegs 23 (0·3%), iets byna ongelooflíks, aangesien 157 (18·5%) van die pasiënte epileptici is. Hierbenewens is die dubbelverdiepinggeboue nie spesiaal vir geestesgebrekkiges ontwerp nie, en die verwagting was dat die voorkomssyfer veel hoër sou wees. Ons bied 2 hoofredes vir die geringheid van die getal: geestesgebrekkiges is merendeels stiller, meer passief en hulle beweeg minder en langsamer as die normale persoon; hulle sit of staan liewer rond as om uitgelate te beljaar of rof te speel. Boonop is die toesig oor die pasiënte tradisioneel besonder goed, nie alleen aan die kant van die personeel nie, maar by uitstek onderling deur die pasiënte self. Persone wat dit nie beleef het nie, kan beswaarlik 'n denkbeeld vorm van die dikwels hartroerende wyse waarop die een pasiënt, soms laegraadse imbesiele, 'n ander bevriend, en hom soms lewenslank onder sy beskerming neem. Dit is 'n vry algemene verskynsel en stellig 'n vername rede waarom so min ernstige beserings opgedoen word.

Huidsiektes. Dit was 'n veelvoorkomende rede vir mediese aandag; 1,499 (22·6%) van al die verwysings was vir hierdie rede. Omdat die voorkoms so hoog is, is 'n onderverdeling as volg

getref: pitswere 977 (14·7%), jeuksiekte 135 (2·0%), sellulitis 34 (0·5%), en ander huidsiektes 353 (5·3%). Mongole is baie vatbaar vir huidsiektes en kry dikwels pitswere, en geestesgebrekkiges is baie geneig om aan hulle seertjies te krap en daarmee te speel, sodat huidsiektes moeilik gekontroleer word.

Asemhalingstelsel. Die volgende onderverdeling word getref: influensa 244 (3·7%), longontsteking 113 (1·7%), asma 15 (0·2%), andere 270 (4·1%). Die verwagting was dat longontsteking veel hoër sou wees, omdat dit so moeilik is om geestesgebrekkiges teen blootstelling te vrywaar.

Spysverteringstelsel. Dat die voorkoms, 537 (8·1%) so hoog is verbaas nie. Die pasiënte kry byna 'n oormaat aan voedsel, smaaklik toeberei, en volgens 'n dieetskaal wat oor 14 dae afgewissel word, sodat sommiges vanselfsprekend onoordeelkundig eet. Verder word 'n hoë persentasie, nagenoeg 20% deur andere gevoed, wat ook oorvoeding in die hand werk. Die volgende onderverdeling is getref: diaree 166 (2·5%), disenterie 111 (1·7%) braak 61 (0·9%), maagpyne 48 (0·7%), hardlywigheid 37 (0·6%), wurms 29 (0·4%), breuke 23 (0·3%), lewersiektes 22 (0·3%), swere 15 (0·2%), gastro-enteritis 12 (0·2%), blindedermontsteking 1 (0·02%), uitsak van endderm 6 (0·1%), slegte spysvertering 6 (0·1%).

Geen Abnormaliteit gevind nie. Dat baie geestesgebrekkiges 'n voorliefde koester vir allerlei klagtes en denkbeeldige pyne is bekend. Die verantwoordelikheid berus nietemin by die verpleegkragte om alle klagtes ernstig op te neem, en die passende diagnose aan die mediese beamptes oor te laat. In 147 (2·2%) verwysings is geen abnormaliteit gevind nie. Hoog soos dit is, oortref dit ons verwagting nie.

Bloedvaatstelsel. Die 134 gevalle word as volg onderverdeel: hart 23 (0·3%), bloedvate 106 (1·6%), bloed 5 (0·1%).

Senustelsel. Die 79 (1·2%) gevalle sluit ook 12 (0·2%) herpes en 26 (0·4%) status epilepticus in, 'n geringe syfer inaggeneem dat daar 157 epileptici op die register was.

Bene en Gewrigte. Onder eersgenoemde was daar 1 geval; onder gewrigte, 75 (1·1%).

Besmetlike Siektes. Kinders word na toelating tot die inrigting teen witseerkeel, kinkhoes en maagkoors ingespuit, en ons let op die gerusstellend geringe voorkoms van besmetlike siektes, 'n totaal van 75 (1·1%) as volg onderverdeel: longtering 22 (0·3%), ander teringgevalle 13 (0·2%), masels 18 (0·3%), pampoentjies 8 (0·1%), waterpokkies 5 (0·1%), witseerkeel 2 (0·03%), skarlakenkoors 5 (0·1%), Duitse masels 2 (0·03%).

Gewigsverlies. Die pasiënte word gereeld geweeg, en 49 (0·7%) verwysings was vir hierdie rede, iets gerusstellends, want die voeding van 'n aansienlike getal pasiënte, veral jeugdige idiote, is 'n tydrowende, moeisame proses, en die verwagting was dat die voorkoms hoër sou wees.

Gewasse. Van die 29 (0·4%) gevalle was 7 (0·1%) kwaadaardig en 22 (0·4%) nie-kwaadaardig.

Ander Siektes. Daar was 34 (0·5%) gevalle, wat 2 van die endokrinestelsel insluit. Daar was geen gevalle van vergiftiging, tekorte, gebrekkige metabolisme of spirogitis nie.

GESLAGSVERSKILLE

Ons sal hier geen poging aanwend om die wesenlikheid al dan nie van verskille op statistieke grondslag te toets nie, veral by gemis aan groter getalle; trouens ons doel is slegs om die algemene strekking van geslagsverskille met hul praktiese implikasies aan te dui. Die totaal manlike gevalle was 2,674 (40·3%) teenoor 3,955 (59·7%) vroulike, 'n getalsverhouding wat nagenoeg ooreenkom met dié van mans tot vroue op die inrigtingsregister.

Geen geslagsverskille het by beserings, siektes van die oor, neus, oog, spysverteringstelsel, bloedvaatstelsel, urinestelsel, besmetlike siektes, gewigsverlies, gewasse en ‚ander siektes' aan die lig gekom nie.

Terwyl daar geen verskille in sellulitis en ‚ander huidsiektes' voorgekom het nie, het pitswere en jeuksiekte 2 maal so dikwels onder manlike as vroulike pasiënte voorgekom. Wat ook al die oorsake hiervan mag wees, die afleiding is dat verpleegpersoneel hieroor ingelig behoort te wees, ten einde steeds daarmee rekening te kan hou.

By tandheelkundige verwysings vind ons 'n treffende geslagsverskynsel. In die geval van manlike en vroulike idiote is die voorkoms eners, 9·5% en 9·8% onderskeidelik; maar namate die verstandelike peil styg, verskyn daar 'n geslagsverskil, met vroue in die meerderheid, sodat hoëgraadse vroue 262 (21·1%) gevalle teenoor 106 (15·4%) manlike toon. Daar is insgelyks 242 (14%) vroulike teenoor 117 (11·4%) manlike imbesiele gevalle. Die verklaring lê voor die hand: idiote soek nie selfstandig behandeling nie; alles berus by die personeel; maar hoe hoër die verstandelike peil, hoe sterker die kanse dat die individu self behandeling soek, en die vroue doen dit die getrouste, 'n neiging van die vroulike geslag wat ook in ander siektes tevoorskyn kom. Vir hierdie geslagsverskynsel is daar meer as een moontlike verklaring, wat egter nie hier ter sake is nie; genoeg dat dit 'n verskynsel is waarmee die verpleging rekening behoort te hou.

Ons vind geen geslagsverskille ten opsigte van influensa en longtering nie, maar in die geval van asma en ander siektes van die asemhalingstelsel is vrouens in die meerderheid met 214 (5·4%) teenoor 71 (2·7%) gevalle.

In die voorkoms van siektes van die keel is daar ook 'n sterk geslagsfaktor; daar is proporsioneel 4 maal soveel vroulike as manlike gevalle. By die verwysings waar geen abnormaliteit gevind is nie, is die vroue ook in die meerderheid met 105 (2·7%) teenoor 42 (1·6%) gevalle, 'n moontlike aanduiding van sterker onderliggende gevoelens van angs en onsekerheid aan die kant van die vrou. Soortgelyke geslagsverskille kom aan die lig by aandoenings van die spierstelsel, met 129 (3·3%) vroulike teenoor 14 (0·5%) manlike gevalle. By siektes van die senustelsel en gewrigte is daar ook proporsioneel 2 maal soveel vroulike as manlike gevalle.

VERBAND TUSSEN SIEKTEVERSKYNSEL EN GRAAD VAN GEESTESGEBREK

Al die besonderhede en tabelle van gegewens wat onder hierdie hoof ingesamel is, kan nie hier weergegee word nie. Dis 'n ingewikkelde probleem, en oorhaastige interpretasies en gevolgtrekkinge sou misleidend wees. Vir ons doel spits ons die aandag slegs op die mees praktiese hoofresultate, wat hier beknop weergegee word.

By die volgende aandoenings het daar geen wesenlike verskille in die voorkomssyfers van die onderskeie verstandsgroepe aan die lig gekom nie: sellulitis, aansteeklike siektes, gewigsverlies, ‚ander siektes', ‚geen abnormaliteit', siektes van die oog, senustelsel, urinestelsel, bloedvate. Die verwagting was dat sellulitis en oogsiektes meer onder idiote as onder hoër grade sou voorkom; maar terwyl idiote en imbesiele, veral mongole, betreklik dikwels vir seeroë behandeling ontvang, moet morone daarenteen dikwels vir brille na 'n oogaarts verwys word.

By die volgende aandoenings was die verwysings van laer verstandsgroepe in die meerderheid: beserings, pitswere, jeuksiekte, disenterie, diaree, en siektes van die bloed. Hoe laer die verstandelike peil, hoe sterker die neiging tot hierdie aandoenings, 'n verhouding wat in sommige gevalle besonder hoog was; so bv. was die voorkoms van disenterie onder idiote 6½ maal so hoog as onder morone, terwyl dit vir imbesiele effens hoër as vir morone was. Nagenoeg dieselfde verhouding geld vir diaree, waar die voorkoms onder idiote 4 maal so hoog, en onder imbesiele byna 2 maal so hoog as

onder morone was. Pitswere het byna 2 maal so dikwels onder idiote as onder morone voorgekom, met imbesiele halfweg tussen beide. Jeuksiekte het 2 maal so veel onder idiote as onder imbesiele en morone voorgekom. Dat beserings meer onder idiote voorkom as onder die hoër grade is volgens verwagting; die voorkoms vir idiote was 25·8% van hul totale verwysings, vir imbesiele was dit 22·9% en vir morone, 19·4%; die verwagting was egter dat hierdie verskille groter sou wees. Die 5 gevalle van siektes van die bloed was 4 idiote en 1 laegraadse imbesiel.

By die volgende groep verwysings vind ons 'n direkte verhouding tussen voorkomssyfer en verstandelike vermoë. Hoe hoër die intelligensie, hoe hoër die voorkoms: ‚ander huidsiektes', tande, asemhalingstelsel, oor, neus, keel, spierstelsel, gewrigte, voortplantingsorgane, gewasse.

By etlike hiervan is die voorkoms onder morone en imbesiele proporsioneel die hoogste, hoofsaaklik omdat hulle, soos welbekend, gevoeliger vir pyn is, en boonop beter in staat om hul ongesteldheid onder die personeel se aandag te bring as die idiote. In sommige van hierdie verskille is daar stellig ook 'n ouderdomsfaktor; idiote is in die geheel aansienlik jonger as imbesiele en morone. Byvoorbeeld, die gemiddelde ouderdom van 154 laegraadse idiote met IK 0-15 was $19\frac{1}{2} \pm 7\frac{1}{2}$ jaar, terwyl dit vir 146 hoëgraadse imbesiele $37 \pm 22\frac{1}{2}$ jaar was. Die voorkoms van ‚ander huidsiektes' was $2\frac{1}{2}$ maal so hoog onder morone (6·9%) as onder idiote (2·8%), terwyl dit vir imbesiele halfweg tussen beide lê; vermoedelik het ons hier deels met 'n beroepsfaktor te doen, aangesien baie van die werk van die inrigting deur morone en hoëgraadse imbesiele gedoen word, terwyl laergrade geen werk verrig nie.

Aandoenings van die asemhalingstelsel het die hoogste voorkoms onder imbesiele en die laagste onder idiote, vermoedelik omdat imbesiele minder kontroleerbaar is; hulle loop meer rond, is meer buitenshuis en kan hulself nie effens oppas nie. Idiote is in die minderheid, stellig omdat hulle meer binnenshuis is, en meer intensief verpleeg en teen blootstelling kan beskerm word.

Die voorkoms van tandheelkundige gevalle is 187 (9·6%) idiote, 359 (13%) imbesiele, en 368 (19%) morone. Idiote is minder gevoelig vir tandpyn, en boonop kan hulle nie op eie aandrang behandeling bewerkstellig as hulle tandpyn het nie; maar daar is ander redes vir hul agterstand: hulle het minder tande, dit kom later uit, hulle kry nie valstande nie, en hulle sterf op jonger leeftyd as die hoërgrade.

Wat goedaardige gewasse betref, was daar 0 idiote, 7 (·25%) imbesiele, en 15 (0·8%) morone. Die 7 gevalle van kwaadaardige gewasse was 1 imbesiel en 6 morone.

BESPREKING

Verpleging van geestesgebrekkiges, veral die laer grade, behels natuurlik veel meer as om hom na die geneesheer te verwys wanneer hy knieserig of siek is, of om die geneesheer se voorskrifte na te kom; en ons 2 tabelle bied maar 'n skamele beeld van die algehele versorging wat die kind geniet. En tog is die gegewens wat dit vervat veelseggend, omdat dit as gerusstellende indeks dien van die mediese aandag en verpleging wat die kind te beurt val; die sprekendste hiervan is die oormatige aandag wat aan geringe beserings en nietige huidsiektes bestee word, inderdaad veel meer as wat die meeste families gegun word. Dit beteken nie dat huidsiektes en beserings so dikwels voorkom nie, maar wel dat dit so buitengewoon nougesette aandag geniet. Wat veral bemoedigend is, is die geringe getal ernstige beserings, inagnemende die groot getal epileptici; dit is moeilik om geestesgebrekkiges teen blootstelling te vrywaar, en tog is daar min gevalle van longontsteking. Daar is min gevalle van besmetlike siektes, gewigsverlies, ens., almal bevindings wat as indeks dien van die sorgvuldige aandag en verpleging wat die kinders ontvang.

Die vraag of die hierbo aangehaalde stelling van Tredgold ten effekte dat geestesgebrekkiges buitengewoon vatbaar vir siekte is, deur ons gegewens gestaaf word, sal aan medici oorgelaat word.

Ons moet gewag maak van die opvallende individuele verskille in die mediese aandag wat geestesgebrekkiges van die verpleegpersoneel verg, sodat enige veralgemening misleidend sou wees. 'n Geringe minderheid vra min of geen behandeling vir siektes nie, maar die personeel moet verwag dat 'n aansienlike aantal dikwels behandeling verg, sommige vir 'n groot verskeidenheid aandoenings, en andere, daarenteen, herhaaldelik vir dieselfde rede. Die bevinding dat kinders vir heel nietige redes herhaaldelik verwys word, dui op 'n gesonde tradisie.

Die bevinding dat manlike geestesgebrekkiges neig om hul aandoenings te verswyg of verwaarloos, sal as waarskuwing vir die verpleegpersoneel dien om dubbel waaksaam te wees in die manlike afdelings. 'n Aangewese voorsorgsmaatreël sou miskien wees om roetine inspeksies vir sekere gebreke te hou. Mag ons die vraag opper of sommige van die erlangde geslagsverskille nie dieper mediese navorsing verg nie?

Verpleegpersoneel besef dat daar verskille van 'n algemene aard tussen verstandsgroepe ten opsigte van hul siektes bestaan, en dat laegrade nie die bekwaamheid besit om self behandeling in te roep nie. Ons gegewens bevestig hierdie ervaring en verleen dit presieser, numeriese gestalte. Dit beklemtoon ook die noodsaaklikheid om steeds bewus te wees van die spesifieke voorsorg wat hierdie verskille vereis. Veral die bevinding dat imbesiele as 'n groep meer neig om longontsteking op te doen, ofskoon geensins uitermatig nie, sal bv. die verpleegpersoneel ongetwyfeld aanmoedig om ekstra waaksaam te wees by die beheer oor hierdie groep.

Ofskoon al die statistieke gegewens betreffende 'n ouderdomsfaktor in die onderskeie siekteverskynsels behoorlik gedokumenteer is, kon dit om praktiese redes nie by hierdie verslag ingelyf word nie.

OPSOMMING

'n Statistieke opname van siekteverskynsels onder geestesgebrekkiges gedurende 'n tydvak van 30 maande is gemaak.

Geslagsverskille en verskille tussen die onderskeie verstandsgroepe is opgespoor.

Enkele praktiese gevolgtrekkinge vir die verpleging van geestesgebrekkiges word aangedui.

Ek is dank verskuldig aan dr. E. F. M. Terblanche, mediese beampte aan die Alexandra-Inrigting, vir waardevolle hulp van velerlei aard, en ook aan dr. B. P. Pienaar, Adjunk-Kommissaris vir Geesteshigiëne, vir toestemming om te publiseer.

VERWYSING

1. Tredgold, A. F. (1952): *Mental Deficiency*, 8ste uitg., bls. 141. Londen: Baillière, Tindall and Cox.

DERMATOLOGY IN GENERAL PRACTICE*

R. SCHAFFER, M.A., M.D.

Queenstown

Individuals and their skins differ very considerably in their reaction to varying conditions, both physical and emotional. One skin will blush without apparent reason while another may fail to change colour even though accepted convention may demand that it should. Both the skin and conjunctivae of the redhead may react violently to either physical or emotional stimulation while a brunette may react more violently but give no dermal indication of either her actions or reactions.

Individual skins also differ in their response to physical and emotional trauma, parasitic, bacterial or fungal invasion, and internal and external assaults from what our friends the trade representatives call 'ethical preparations'.

Every disease must have a cause, but in no other group of diseases is relationship between cause and effect more variable and more dependent on individual susceptibility than in skin diseases. In no other diseases is it more essential that the doctor should know the patient. The patient is always more important than his disease.

It is the duty of the general practitioner to know and understand his patient and he cannot do this unless he has been suitably trained. He cannot be suitably trained by teachers who have no knowledge of general practice and no experience outside the artificial environment of the Teaching Hospital. It has always been, and still is, most unfortunate that medical students learn more about rare neurological lesions than about pruritus, acne and other common ailments.

The practice of medicine has always been, and should always be, an art, but an art based on sound scientific knowledge and scientific principles. It is essential that it remain such. Dermatology has now become a science, even if not always an exact science. Since penicillin has divorced dermatology from the ancient and once remunerative art of venereology it has become a popular speciality both with the doctor and the patient. But even with its newly acquired status, dermatology has not very materially changed either the classification or the prognosis in skin diseases.

Many years ago, skin diseases could be divided into two main categories: syphilitic and non-syphilitic. The non-syphilitic were occasionally classed and treated as syphilis because when in doubt the clinician was right and the laboratory was wrong. The non-syphilitic dermatoses were either acute or chronic and either parasitic, infective or of uncertain origin. Modern research has not changed our views on the aetiology of many of the conditions in this last category. Psoriasis serves as a good example. Treatment and prognosis have not changed. It is true that chrysarobin is no longer fashionable—Dithranol is used in its place, but the results are the same. Fifty years ago arsenic was prescribed for skin diseases of doubtful or unknown origin. It is still prescribed and when everything else fails mercury is also used. As all chronic skin diseases have occasional remissions, usually associated with changes in mood of the sufferer, there can be no doubt that both arsenic and mercury have at times been prescribed at the correct time and have been given credit where no credit was due.

It is not necessary that the general practitioner should be able to diagnose every skin condition. This can only be done by some dermatologists and by some skin pathologists. The general practitioner must be aware of his limitations. But it is essential that he should have a sound knowledge of all the commoner skin diseases and that he should know what not to do.

When a skin disease is difficult to diagnose the wise general practitioner will refer the case to a dermatologist without delay. The dermatologist, of course, may also have difficulty about the diagnosis, but he will not be blamed if the condition proves to be chronic; the specialist is never blamed, but the general practitioner will not be forgiven should he not have referred the case early. The country practitioner cannot always send the patient to a specialist, but he can always, if in doubt, do a skin biopsy and send the specimen to an expert skin pathologist. There are many conditions which can only be diagnosed correctly with the microscope. If possible, a good colour photograph should also be sent and, of course, a good clinical history is essential.

Conditions such as lupus erythematosus, though commoner than generally thought, are not diagnosed every day. Unless the general practitioner has had special training in dermatology he should not assume responsibility for the treatment of such conditions. He will get very little thanks and will get a great deal of blame.

Infantile Eczema

Infantile eczemas are very common and are the cause of many headaches, both for the doctor and the parents. It is essential that the general practitioner should know what not to do in these cases.

The eczema is not cured by changing the baby's food every time the napkins are changed. The skin condition is also not materially benefited by ointments, pastes and lotions. Infantile eczema is, in most cases, a psychosomatic manifestation indicating that the infant feels insecure in a very unstable world. This sense of insecurity is often the result of paternal rejection, maternal engulfment, or stupid interference by one or both mothers-in-law. Phenobarbitone should in no circumstances be given to the child, for it may lead to future barbiturate sensitization, but it can with advantage be given to the parents. The prescribing of tranquillizers for the mother, and in some cases also for the father, has often in my experience cured an obstinate infantile eczema. A notice prominently displayed in the nursery stating in both official languages that babies are not to be shaken may perhaps also do some good. Eczema can be caused by food allergy but this, in my experience, is not the most common cause.

Drug Allergies

There is great competition between the manufacturers of antibiotics and chemotherapeutic drugs and we are told

*A paper presented at the South African Medical Congress, Durban, September 1957.

of new drugs almost every day. Many of these drugs are new in name and some in formula, but they often have a molecular resemblance to other drugs previously employed. The patient who has become allergic to one drug may also be sensitive to chemically similar preparations. It cannot be pointed out too frequently that substances likely to cause sensitization should never be used on the skin and should also not be used in minor conditions where their use is entirely unnecessary. Penicillin and sulphonamides should under no circumstances be used as ear drops, nose drops, lozenges and other sensitizing media. Other antibiotics should also not be used in this way. The only substances of this nature which are safe on the skin are antibiotics such as bacitracin and neomycin which are too dangerous to be given by mouth or by injection.

Most minor ailments get well if the natural defence mechanism is not interfered with. Unnecessary prescribing of chemotherapeutic and antibiotic substances interferes with the natural defence mechanism and also renders many families of micro-organisms immune to the substances employed. Antibiotics which are more or less selective in their action may also destroy organisms which serve a useful function in keeping other and less desirable organisms in check. The indiscriminate use of antibiotics is rapidly producing immune strains of virulent organisms, particularly staphylococci, and is also producing a sensitized allergic population.

Penicillin-sensitive patients, sulphonamide and barbiturate reactors, streptomycin sensitives, tetracycline reactors, when added to salicylate, iodide and even antihistaminic-sensitive humanity, form a considerable percentage of the patients who seek our advice. Drug reactions and drug allergies may be difficult to diagnose on account of the wide variation in the appearance of the affected skin. There is no known skin disease which cannot be simulated by a drug reaction. Correct diagnosis is impossible unless the doctor has the time and the patience to obtain a reliable history.

Treatment is sometimes difficult and prolonged. All external applications are good, provided they can be relied upon to be inert. Calamine lotion is always safe and has the added advantage of not being an excessive drain on the patient's pocket. A saline dressing is sometimes very useful and an inert powder may relieve the symptoms. Antihistaminics given internally have a sedative action and are therefore useful. Applied externally they are either useless or harmful. In severe cases it may be essential to use ACTH or corticosteroids. The response is occasionally, but not universally, dramatic.

Contact Dermatitis

Modern man, particularly when employed in industry, is not always well adjusted to his industrial environment. The ability of the skin to adapt itself to the many substances with which it comes in contact largely reflects the ability of the owner to make a physical as well as emotional adjustment to his circumstances. Failure to adapt causes psychoneurosis and predisposes to contact dermatitis.

There is no industrial chemical, no oil, no paint or dye, no cosmetic, no ointment and no ointment base which will not at some time cause contact dermatitis. When this dermatitis involves the hands and is caused by some substance with which the sufferer must come in contact as a result of his employment, barrier creams may be useful, but they are not the answer to the adjustment problem. Antihistaminics are useless. Hydrocortisone and other corticosteroid-containing ointments will often suppress but will not cure the condition.

Many patients, particularly housewives, become sensitive to soap. Substituting a preparation such as Phisoderm for soap will sometimes cure the condition. Dermatitis of the face and neck is often cured when the redhead or blonde gradually resumes her natural colouring.

Ringworm

Ringworm of the skin is not very serious and presents no diagnostic problems. Treatment with weak tincture of iodine, with carbol-fuchsin or with phenyl mercuric nitrate is satisfactory. Irrespective of the method of treatment employed it must be discontinued after 4, or at the most 5 days. If the treatment is not discontinued a very unpleasant dermatitis may develop.

Ringworm of the scalp is sometimes very resistant. When the simpler forms of treatment do not cure the condition I refer these cases to the dermatologist or radiologist for X-ray epilation.

Epidermophytosis is still very common. The results of over-treatment are always worse than the disease. Foot powders containing undecylenic acid are probably the most satisfactory form of treatment.

Light Sensitivity

Many eczematous conditions of the hands and face are caused by sensitization to sunlight. Sulphonamides make the skin more photosensitive and should never be prescribed to light-sensitive patients. Chloroquin (Aralen) may be prescribed in these cases and often reduces the sensitivity to light. Mepacrine is equally good, but stains the skin if given for prolonged periods.

Pyodermas

About 12 years ago sulphonamide ointments and penicillin ointments heralded a great advance in the treatment of bacterial infections of the skin. They are no longer used on account of the very high incidence of severe sensitization reactions. The most suitable ointments for use in these conditions contain neomycin, bacitracin and polymyxin. Tetracyclines and erythromycin are also very useful in ointment form, but are best avoided. These broad-spectrum antibiotics are best given by mouth. Parenteral penicillin is not always contra-indicated in these cases, but should be avoided if possible.

Pruritus

Pruritus, particularly pruritus ani, is a most distressing and embarrassing condition. It is very common after the prolonged use of broad-spectrum antibiotics, when it is caused by a monilial infection. Vitamin-B complex should always be prescribed when tetracyclines are administered for a long period. Mycostatin usually cures the monilial infection. Every case of pruritus requires most careful investigation. Blood dyscrasias, renal disease, diabetes and subclinical jaundice can all cause severe itching. Many cases of pruritus are psychogenic in origin and tranquillizing drugs are very useful in these cases. When the population has become sensitized to the presently popular tranquillizers their use will also be contra-indicated.

Acne

Acne is the commonest of all skin diseases. It is a disease of adolescence and is associated with excessive production of androgens in relation to oestrogens. It is related to the physiological transition of the skin to the adult stage, and is occasionally associated with emotional maladjustment. Hot water and liquid soap followed by the use of a sulphur lotion is good treatment. Small doses of oestrogens can safely be given to both sexes. In some cases small doses of thyroid are useful. Unless acne is treated early, permanent scarring may result and this, particularly in the case of young girls, sometimes has unfortunate psychological consequences.

Sufferers from acne must have sufficient exercise, sufficient recreation and suitable social interests. They must be assured that acne can be cured. Suitable friendships with members of the opposite sex are more effective than pills and lotions.

It is essential that young people have a suitable diet. Protein and vitamin intake must be sufficient and the consumption of fat and carbohydrate can with advantage be reduced, but diet will not cause or cure acne.

The general practitioner must know and understand his patients. He must be guide, philosopher and friend, know their secrets, share their joys and understand their problems. This is his duty and his privilege. Having the confidence of his patients, the family doctor can solve problems in personal relationships. He can assist in removing tensions and anxieties which play such an important part in the aetiology of skin diseases.

'HIPPOCRATIC OATH' AT CAPE TOWN

The 2,300-years-old Hippocratic Oath is the prototype of many oaths and declarations to which medical practitioners have been required to subscribe on admission to the medical profession in various parts of the world in ancient and modern times. Medical graduands are today commonly called on to subscribe to an oath or declaration by their respective universities before admission to their qualifying degree.

The University of Cape Town prescribes a declaration of this kind which it has hitherto been the practice for the M.B., Ch.B. graduands to make in an informal manner before the Principal and Registrar at the university office. This year, at the instance of the Medical Students' Council, the University held a more formal ceremony in the Medical School, Observatory, Cape. This took place on 12 December 1957, when Prof. R. W. James, the Vice-Chancellor and Acting Principal presided, supported by the Registrar and the professorial staff of the Faculty of Medicine.

After the Vice-Chancellor and Dr. A. W. S. Sichel had addressed the meeting, the 1957 M.B., Ch.B. graduands affirmed the declaration prescribed by the University and then individually subscribed to the declaration, which is in the following terms:

> 'I, . . . , solemnly declare that as a graduate in medicine of the University of Cape Town, I will exercise my profession to the best of my knowledge and ability, for the good of all persons whose health may be placed in my care, and for the public weal; that I will hold in due regard the honourable traditions and obligations of the medical profession, and will do nothing inconsistent therewith; and that I will be loyal to the University and endeavour to promote its welfare and maintain its reputation.'

The graduands then voluntary affirmed the Declaration of Geneva. This declaration, which was adopted by the World Medical Association in 1948, and is regarded as embodying in modern form the spirit of the traditional Hippocratic Oath, is in the following terms:

> 'At the time of being admitted as a member of the medical profession—I solemnly pledge myself to consecrate my life to the service of humanity;
>
> I will give my teachers the respect and gratitude which is their due;
>
> I will practise my profession with conscience and dignity;
>
> The health of my patient will be my first consideration;
>
> I will respect the secrets which are confided in me;
>
> I will maintain by all the means in my power, the honour and the noble traditions of the medical profession;
>
> I will not permit considerations of religion, nationality, race, party, politics or social standing to intervene between my duty and my patient;
>
> I will maintain the utmost respect for human life, from the time of conception; even under threat, I will not use my medical knowledge contrary to the laws of humanity.
>
> I make these promises solemnly, freely and upon my honour.'

The meeting concluded with an address by Mr. J. Katz, 1957 Final Year Class Representative. The assembly stood during the entrance and retiral of the Vice-Chancellor and his platform supporters.

DR. SICHEL'S ADDRESS

Dr. A. W. S. Sichel's address was as follows:

It is a privilege and a pleasure to have been invited to address you on this occasion when, after 6 years' hard labour, you are about to have conferred on you the degree of Batchelor of Medicine and Batchelor of Surgery of the University of Cape Town. It is an occasion which your Acting Principal has described as a solemn one.

Your Medical School was the first to be established in the Union of South Africa and has during the past 40 years built up a prestige and tradition to which you must constantly endeavour to live up. It has a reputation which will bear comparison with any other medical school in the world.

You have still one year of internship to do, a period of further study imposed by the South African Medical and Dental Council for your own good, but particularly in the interests of the public. You will now have an opportunity to put into effect what you have learnt, but under supervision.

When your medical education has been completed you will emerge as fully-fledged doctors, free to act and think for yourselves subject to the laws of the land, the code of ethics prescribed by the Medical Council, and the Hippocratic Oath.

General Practice and Specialization

Many of you will enter general practice and it is to those of you who do that I address my remarks especially. Once in practice, crammed with book knowledge, you will have to revise or modify much of what you have been taught up to now. You have worked in a well-equipped and well-organized teaching hospital with extensive ancillary services. In practice you will find yourselves deprived of information served to you on a platter. You will have to rely on your own powers of observation and exercise your own judgment. You will work to some extent by trial and error and you will make mistakes. Do not take it amiss if I express the hope that you will make mistakes, for once you have made a mistake, you will never repeat it. Beware of the man who has never made a mistake, remembering that the best man is he who makes the fewest mistakes.

Do not hold exaggerated ideas of your own importance or assess your knowledge too high. Always be humble enough to seek advice from those competent to give it. Never be ashamed of your limitations, and when you get out of your depth try to get assistance. Your greatest asset will be common sense, something that you have not gleaned from text-books.

It may be that some of you already have decided to specialize or will have to come to a decision in the near future. In my opinion specialism today is being overdone, with the result that there is a

superabundance of young specialists in the large urban areas, which will lead to cut-throat competition in the struggle to make a livelihood. At the same time there are not enough general practitioners in the rural areas, partly owing to the fact that even general practitioners themselves tend to practise in the larger centres where amenities are more pleasant.

A false gap has been created between specialists and general practitioners because of an impression that the status of the general practitioner is lower. As a matter of fact general practice is really a form of specialism and a most difficult one at that.

The Medical Association

As one who has taken a very active part in the affairs of the Medical Association of South Africa I must take this opportunity of doing some propaganda. In practice you will be confronted with many problems and difficulties. Do you wish to be lone wolves forced to fight your own battles as best you can, or will you combine with your colleagues in a concerted effort to attain your objectives and preserve your rights as individuals? There is only one body which exists as an organization to meet the circumstances, the Medical Association of South Africa, and I strongly advise every one of you to join its ranks; and when you become members do not sit back and complain that your membership seems to mean nothing, but take an active part in its affairs.

In conclusion I wish you all good luck, health and happiness in your future career. Let common sense and fair play be your guiding stars and, if you can, leaven them with humour.

CAPE MIDLAND BRANCH

ANNUAL REPORT OF HON. SECRETARY, DR. P. JABKOVITZ

In reviewing the activities of the Branch for 1957 we cannot regard all our results with the satisfaction we should have liked for reasons to which I shall later refer, but we have, nevertheless, had a very strenuous period.

A suitable room has been set aside in the new hospital additions for our library. We have already taken possession and your Library Committee is busy reducing our bank balance rapidly while building up a very popular choice of reading material. They have wisely devoted most of their choice to journals and the shelves have begun to take on a very professional look. We must record our thanks to the Administrator, who has thus made good an old promise.

Your Branch Council has been fully occupied with the general affairs of the Branch, including matters Ethical, Benevolent, and Contract Practice. Our business meetings have dealt with various items including, chiefly, the vexed question of the Honorary System. Our monthly clinical meetings have been held regularly and, where not addressed by distinguished guests, have been well supplied with instructive and interesting material by the members themselves.

Of the meetings addressed by our guest speakers, those of clinical interest proved most popular. Two lectures by Mr. Rodney Smith, one by Prof. A. H. Louw, one by Prof. R. Turner, and one by Dr. D. M. T. Gairdner were very welcome. We were also pleased to entertain Dr. Routley and Dr. Donaldson. Further, I have much pleasure in informing you that I have already arranged in the agenda this year lectures by Professor Janes of Toronto and Mr. R. W. Raven, whom many of you will remember from your London years. There is also the possibility of visits by members of the teaching staff of the Cape Town University.

Two matters have engaged considerable attention and concern in our Branch. The first was the request by the honorary staff of the Livingstone and Provincial Hospitals, Port Elizabeth, for the use of the Association machinery to abolish the honorary system and to negotiate for its replacement by a system of staffing hospitals on a sessional basis.

The Honorary System

In days gone by, the status of an Honorary was sufficient repayment for his labours for the underprivileged. Beds were not difficult to obtain, he had a resident staff who could combine to make an efficient team, his hospital work might even be an introduction to private work. Today he has to battle against ever-increasing competition for beds for his out-patients. The introduction to private work is negligible. And in the Provincial Hospitals, Port Elizabeth, the resident staff simply does not exist; they are unheard of. Interns are being absorbed as in a vortex by the teaching hospitals, where many in lowly positions circle silently round their centre of adoration, afar, like Sputniks, serving some remote function only later to fade silently from human ken.

We must pay tribute to the excellent work of the many general practitioners who have stepped in to do the work of the resident staff; paid as they are, they can well look at their chiefs with a patronizing air. But whether it be they, or the graded practitioners at the Livingstone, the whole aspect of hospital practice has changed and it can only be a matter of time before it is recognized that the honorary system is an anachronism. Only in the remote corner of the world called the Cape, in which it still survives, can it be re-discovered like the Coelocanth.

Our repeated representation for the abolition of the honorary system over the last 2 years to our Head Office has met with little response, except, perhaps, where it has appeared on the agenda of Federal Council, to be rapidly passed over at some stage of a Federal Council meeting when its members were too weary to give the matter the attention it deserved. You will be asked tonight to support a concise resolution to Federal Council which we hope will receive the sympathy and support of the majority on Federal Council and also lead to prompt action.

Livingstone Hospital and Postgraduate Study

The other matter which has occupied our thoughts for a considerable time is the rich undeveloped fields for postgraduate study which lie waste in the Livingstone Hospital. Visitors to this hospital stare amazedly at the figures—12,000 admissions a year; 150,000 out-patient attendances, and 20 babies born each day, with an amazing percentage of obstetric abnormalities. The late Prof. van den Ende was one of the few keen enough to envisage the possibilities. In my correspondence with him he displayed considerable insight into the position. He had already brought the matter before the Joint Provincial and University Committee. We hope that his passing will not end the ideal we have before us, but whether the postgraduate school of the future at the Livingstone will be tied up with the Cape Town University, The College of Physicians and Surgeons, or Rhodes University, all of which have been mooted, no one can at this moment foresee. But of one thing there can be no doubt; whoever will exploit the teaching possibilities will find a wealth of material concentrated in a compact area that will make any effort worth while.

OBITUARY : JOHN DRUMMOND, M.D., F.R.C.P. (Edin.)

We regret to announce the death of Dr. John Drummond, M.D., F.R.C.P. (Edin.), of Durban, which took place from coronary thrombosis on 25 January 1958 at Elgin, Cape, where he was visiting on holiday.

Born in New Zealand Dr. Drummond, who was 73 years old, had practised since 1912 at Durban, where he was held in high regard as a consulting physician. Dr. Drummond was long associated with the Medical Association of South Africa and was President of the South African Medical Congress when it was held in Durban in 1946. The funeral took place in Durban.

An In Memoriam notice will appear in a later issue of the *Journal*.

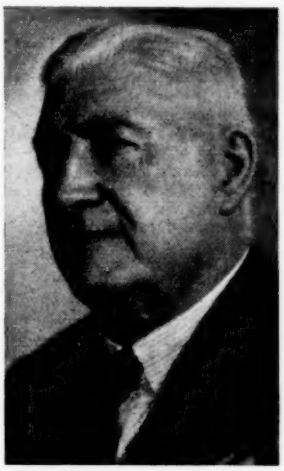
IN MEMORIAM

W. E. G. DUTHIE, M.A., M.B., C.M. (ABERD.), D.P.H.

The death occurred at his home, 7 Lysantold Road, Saxonwold, Johannesburg, on 15 November 1957, of Dr. Ewart Duthie, aged 87, probably one of the oldest graduates in medicine in South Africa. Had he survived a further 2 months, he would have been 88 on 14 January 1958.

William Ewart Gladstone Duthie came from Aberdeenshire, and was educated at the Woodside Public School, Aberdeen Grammar School, and the University of Aberdeen. He graduated M.A. in 1890, and M.B., C.M., in 1894, and subsequently took the D.P.H.

After a period of practice in the United Kingdom, he came to South Africa before the Anglo-Boer War, and during the war served as Railway Medical Officer to the Imperial Forces. Subsequently, after holding appointments as Railway Medical Officer at Trompsburg and Edenburg in the Orange Free State, he settled in Kroonstad, where he was Railway Medical Officer, District Surgeon, and Medical Officer of Health.



Dr. Duthie

In 1925 he proceeded to Johannesburg and practised in the Southern Suburbs and in Orange Grove. However, a cardiac illness in 1934 cut short his professional activities, and he lived a life of retirement, devoting himself largely to gardening and racing, of which latter he was a keen follower. His later years were clouded by ill-health, and after a few month's illness, he died on 15 November 1957.

Dr. Duthie, as a product of the Aberdeen School, was taught by such men as Prof. Sir Alexander Ogston (Surgery), and Prof. D. J. Hamilton (Pathology), and throughout his career exemplified the practical, common-sense approach to medical practice which is so characteristic of Aberdeen teaching.

Dr. Duthie was twice married, and leaves a widow. He is also survived by his elder son Dr. Comyn Duthie, of Johannesburg (the younger having died suddenly in 1955), daughter-in-law, and 3 grandchildren.

* * *

ARTHUR JAMES EWINS, D.SC., F.R.S.

The death is announced of Dr. Arthur James Ewins, joint discoverer of sulphapyridine (M and B 693), at the age of 75 years.

Born at Norwood, Dr. Ewins was educated at Alleyn's School, Dulwich, and in 1899 joined the staff of the Wellcome Physiological Laboratories, Herne Hill, working under the late Prof. George Barger. He graduated B.Sc. from the Chelsea Polytechnic in 1906 and worked for many years with Sir Henry Dale, joining the Medical Research Committee (War Council) with Dale in 1914, in which year he was awarded his D.Sc. He worked on acetylcholine and choline esters and other biological and physiological investigations. After joining May and Baker Ltd. in 1917 he built up a flourishing research organization and was eventually appointed a Director of the firm as Director of Research. With his colleague Phillips he discovered sulphapyridine (the first chemotherapeutic agent for the treatment of pneumonia) and sulphathiazole. Another of his discoveries was the aromatic diamidines, curative for trypanosomiasis and leishmaniasis; of these, one of the best known is pentamidine, which is widely used for protection against African sleeping sickness. In 1943 Ewins was elected F.R.S. He retired in 1952. His chief pleasures were working in his garden, reading and motoring.

PASSING EVENTS : IN DIE VERBYGAAN

The Association of Surgeons of South Africa (*M.A.S.A.*) will hold its first congress in Cape Town on 28, 29 and 30 April 1958. Any medical practitioner interested in surgery will be very welcome and the conveners are particularly anxious that surgeons from all parts of the Union and neighbouring countries should attend. Anyone contemplating attending should please communicate with Mr. D. J. du Plessis, Department of Surgery, Medical School, Falmouth Road, Mowbray, Cape Town.

Die Vereniging van Chirurge van Suid-Afrika (*M.V.S.A.*) se eerste kongres sal op 28, 29 en 30 April 1958 in Kaapstad gehou word. Enige geneesheer wat in snykunde belangstel word besonder welkom geheet en die saamroepers sal dit hoog op prys stel as chirurge uit alle dele van die Unie asook uit die buurstate die kongres sal bywoon. Enigeen wat daaraan dink om die kongres by te woon, word versoek om in verbinding te tree met dr. D. J. du Plessis, Departement van Chirurgie, Mediese Skool, Falmouthweg, Mowbray, Kaapstad.

* * *

Dr. Adolph Meyer, radiologist, until recently at 85 St. George's Street, Cape Town, has moved to 32 Kenmain Gardens, Main Road, Kenilworth, Cape.

* * *

Die nuwe telefoonnommers van dr. Selig Sacks (drs. Sichel en Sacks, Oogaartse, National Mutual-gebou, Kerkplein 17, Kaapstad) is: Spreekkamers 23441 en 21629, woning 78042.

South African Paediatric Association. The next meeting of the Cape Town Sub-group of this Association will be held on Tuesday 4 February 1958 at 8.15 p.m. in the Lecture Theatre, Red Cross War Memorial Children's Hospital, Rondebosch, Cape. Miss Diana Whiting of the Speech Therapy Department of the Groote Schuur Hospital and Red Cross War Memorial Children's Hospital, will speak on 'Speech Disorders in Children'.

* * *

Red Cross War Memorial Children's Hospital, Rondebosch, Cape. In connection with the Postgraduate Seminar Series of lectures which are being held under the auspices of the University of Cape Town Department of Child Health in the Lecture Theatre of the Hospital on the first Wednesday of every month, Dr. J. L. van Selm will speak on 'The Problem of the Squinting Child' on Wednesday 5 February at 5 p.m. All medical practitioners are welcome.

* * *

Dr. W. M. Thurlbeck, of Cape Town, who has spent the past 2½ years working in the Department of Pathology at the Massachusetts General Hospital, Boston, Mass., has been appointed Chief Resident there, under Dr. Benjamin Castleman.

* * *

Research Forum: The next meeting of the Research Forum, University of Cape Town, will be held at Groote Schuur Hospital, Cape Town, in the A-Floor Lecture Theatre on Wednesday 3 February at 12 noon, when the subject will be 'Potassium and sodium balance in relation to paralysis', and the speakers will be Prof. L. Eales Prof. G. C. Linder and Dr. B. Saknofsky.

Dr. Barry Kaplan, M.B., Ch.B. (Cape Town), M.R.C.P. (Edin.), has started practice as Specialist Physician in his temporary consulting rooms at 408 Dumbarton House, Church Street, Cape Town. As from 1 May 1958 his permanent consulting rooms will be at 706-707 Volkskas Building, Adderley Street, Cape Town. Telephone: Rooms 21597, residence 28459, if no reply 692924.

* * *

Members are reminded that they should notify any change of address to the Secretary of the Medical Association of South Africa at P.O. Box 643, Cape Town, as well as to the Registrar of the South African Medical and Dental Council, P.O. Box 205, Pretoria.

Failure to advise the Association can only result in non-delivery of the *Journal*. This applies to members proceeding overseas as well as to those who change their addresses within the Union.

* * *

Fourth World Assembly of the Israel Medical Association will be held in Israel on 12-24 August 1958. The scientific programme will deal with the special medical problems of integrating large numbers of immigrants into the community. Visits to hospitals and clinics will be arranged and members will be able to see how Israel's medical problems are being tackled and solved. Itineraries have been drawn up to enable participants to visit the whole country, and will include visits to historical sites, settlements and branches of industry and agriculture. Special visits will also be arranged to illustrate the activities of the Army and the Navy. A programme of social arrangements will bring visitors into close contact with one another, as well as with the local members of the IMA. In addition, there will be organizational meetings of Non-Resident Fellows and the Israel Association of the History of Medicine and Science.

This Fourth World Assembly of the IMA coincides with the festivities in celebration of the foundation of the State of Isreal. Visitors to Israel will therefore be able to participate in the extensive celebrations that are being prepared by the Israeli Government.

To ensure adequate touring and other arrangements, intending participants should write immediately to Dr. Cyril Adler, Honorary Secretary, Israel Medical Association (Non-Resident Fellowship Project—South Africa) 701 Ingram's Corner, Twist Street, Johannesburg, or Dr. A. I. Goldberg, National Mutual Buildings, Church Square, Cape Town.

* * *

The Central Council for Health Education, London, will hold an International Resident Seminary for Community Health Workers from Overseas on 'The Principles, Methods and Media of Health Education' at the Froebel Educational Institute, Grove House, Roehampton Lane, London, S.W. 15, on 22-25 April 1958, in the week immediately preceding the Congress of the Royal Society of Health. The Seminar is intended for Medical Officers and Health Educators, Nurses, Health Inspectors, Teachers, Social Workers and others concerned with the Health Education of the Public. The programme will be built around the Health Education problems and needs facing participants in their various areas and will be designed to help them to carry out an effective scheme of community Health Education in their particular fields. Attention will be devoted to the basic concepts, principles, methods and techniques and the integrated use of educational material. The morning, afternoon or evening sessions will be held under the following headings: Health is Fundamental, Questions for Discussion, Planning the Programme, Choosing the Method, Mass Media in Health Education (films, radio, television, leaflets, posters), Selecting the Means, Preparation of Reports, Plenary Session, etc. Health Education material, film projection apparatus and other equipment will be on view and observation visits will be arranged to various parts of the UK. Full residence, with accommodation in single rooms will be provided under pleasant conditions at the Froebel Educational Institute. The total fee for tuition and residence, inclusive of gratuities, will be £10 10s. 0d. Application for enrolment should be made to the Medical Director, The Central Council for Health Education, Tavistock House, Tavistock Square, London, W.C. 1.

Union of South Africa. Department of Health. Notification of formidable epidemic diseases and poliomyelitis in the Union during the period 10-16 January 1958:

Poliomyelitis

	Eur.	*Nat.*	*Col.*	*As.*	*Total*
Transvaal	8	2	—	—	10
Cape Province ..	—	2	2	—	4
Orange Free State ..	2	—	—	—	2
Natal	2	1	—	—	3
Totals	12	5	2	—	19

Local Authorities		*Eur.*	*Non-Eur.*
Transvaal:			
Brits Municipality	U	1	—
Delmas District	R	—	1
Geduld Municipality ..	U	1	—
Johannesburg Municipality	U	5	—
Pretoria Municipality ..	U	1	—
Witbank Municipality ..	U	—	1
Cape Province:			
Beaufort West Municipality	U	—	1
Caledon Divisional Council	R	—	2
Port Elizabeth Municipality	U	—	1
Orange Free State:			
Henneman Municipality ..	U	1	—
Welkom Municipality ..	U	1	—
Natal:			
Durban Borough	U	1	—
Isipingo Beach Health Committee	U	1	—
Paulpietersburg District ..	R	—	1

U — Urban R — Rural

Correction: Transvaal: One (1) European case in the Pretoria Municipality notified in No. 1 of 1958, has subsequently been diagnosed as not Poliomyelitis.

Plague, smallpox. Nil. *Typhus Fever. Cape Province:* One (1) Native case in the Malmesbury District. All necessary precautions taken.

Correction: Cape Province: The fifteen (15) Native cases which were reported in Bulletin No. 49 of 1957, have subsequently been reduced to twelve (12) as three (3) were diagnosed as Influenza and not Typhus Fever.

* * *

Unie van Suid-Afrika. Departement van Gesondheid. Aangifte van gedugte epidemiese siektes en poliomiëlitis in die Unie gedurende die tydperk 17 tot 23 Januarie 1958.

Poliomiëlitis

	Bl.	*Nat.*	*Kl.*	*As.*	*Totaal*
Transvaal	7	2	–	1	10
Kaapprovinsie ..	1	2	3	–	6
Oranje-Vrystaat ..	–	–	–	–	–
Natal	1	–	–	–	1
Totaal ..	9	4	3	1	17

Korreksie

Poliomiëlitis: Een (1) Blanke geval in die Kaapprovinsie wat in Nuusbrief No. 3 van 1958 vermeld was, is sedertdien as nie-Poliomiëlitis gediagnoseer.

Pes, Pokkies: Geen.

Tifuskoors. Kaapprovinsie: Vier (4) Naturellegevalle in die Glen Grey-distrik en een (1) Naturellegeval in die munisipale gebied van Queenstown. Bekragtig deur Laboratoriumtoetse. Alle voorsorgsmaatreëls getref.

NEW PREPARATIONS AND APPLIANCES : NUWE PREPARATE EN TOESTELLE

MYSTECLIN-V SUSPENSION

Squibb Laboratories announce the introduction, complementary to Mysteclin-V Capsules, of Mysteclin-V Suspension, a pleasant tasting cherry-flavoured oil suspension containing tetracycline phosphate complex equivalent to 125 mg. of tetracycline hydrochloride and 125,000 units of nystatin per 5 c.c. teaspoonful, supplied in 2-ounce bottles; and supply the following information:

The new phosphate complex of tetracycline, as supplied in Mysteclin-V, provides the same broad-spectrum effectiveness of the older tetracycline hydrochloride, but produces substantially faster and higher initial blood concentrations. This new form of the most widely prescribed of all broad-spectrum antibiotics will prove to be particularly useful for a prompt attack against the common bacterial infections.

Because the broad-spectrum antibiotics disturb the bacterial equilibrium of the intestinal tract, an overgrowth of the fungus *Candida* (*Monilia*) *albicans* may frequently occur. Such overgrowth can give rise to troublesome and even serious clinical manifestations. For this reason, Mysteclin-V Suspension contains Mycostatin, the first safe antibiotic with specific antifungal activity which acts as an effective defence against this complication of antibiotic medication.

Supplies of Mysteclin-V Suspension are available from all wholesale and retail sources. Squibb Laboratories (Pty.) Ltd., P.O. Box 9975, Johannesburg.

* * *

RESUSCITATION: THE STEPHENSON MINUTEMAN

African Oxygen Limited have introduced an up-to-date type of a portable fully automatic oxygen resuscitator under the name the Stephenson Minuteman and supply the following information:

This new unit incorporates a number of remarkable improvements over previous units of a similar kind:

1. Treatment of 1-3 patients simultaneously.
2. Adjustable breathing pressure and frequency for adults and children.
3. Oxygen resuscitation or inhalation variable, from 100% O_2 to 50% O_2.
4. Suitable as a highly portable field unit or as a stationary wall unit in ambulance rooms, etc., or as a hospital unit.
5. Allows for two 72-gallon light-weight steel oxygen cylinders for field use (one permanent, one spare) and the connecting of any large-size oxygen cylinder for stationary or hospital use.

A practical demonstration can be arranged by any branch of Messrs. African Oxygen Limited, P.O. Box 5404, Johannesburg, from whom further information may be obtained.

REVIEWS OF BOOKS : BOEKRESENSIES

THE STUDENT LIFE

The Student Life. The Philosophy of Sir William Osler. Edited by Richard E. Verney, M.B., F.R.C.P.E., D.R. Pp. xiii + 214. 15s. net. + postage 9d. (abroad). Edinburgh and London: E. & S. Livingstone Ltd. 1957.

Contents: Foreword by John Bruce. Foreword by Alec H. Macklin. Preface. The Student of Medicine. The Qualities Required of The Physician. The Profession of Medicine. The Foundations of a University Education. The Clinical Years. The Collection of a Library. The General Practitioner. The Consultant Physician. Service in the Armed Forces. A Way of Life. The Christian Way of Life. L'Envoi. Biographical Studies. Appendix. The Oath of Hippocrates. Sponsio Academia—University of Edinburgh. References. Index.

The editor of this little anthology states in his preface that it is designed for those of the modern generation who like their learning presented to them in an easily assimilable form. One wonders how much is gained by modernisation of some of the sentences and it is perhaps a pity that the text has not been left completely intact. What is far more important, however, is that here we have Osler, the man, far better portrayed by his own words than ever he could be by any history or commentary. The footnotes and the indexing make understanding these pages easier, and they can be thoroughly recommended to all students for digestion not only as a study in itself but especially with a view to further reading.

R.S.

DYNAMICS OF PSYCHOTHERAPY

Dynamics of Psychotherapy—The Psychology of Personality Change. Volume II. Process By Percival M. Symonds, Ph.D. Pp. xlv + 398. 86·50. New York and London: Grune & Stratton, Inc. 1957.

Contents: Foreword. XVII. Basic Principles of Transference. XVIII. Positive and Negative Transference. XIX. The Expression of Transference. XX. Countertransference. 1. XXI. Countertransference. 2. XXII. Function of Transference and Countertransference in Psychotherapy. XXIII. Resistence. 1. XXIV. Resistance. 2. XXV. Resistance. 3. XXVI. Abreaction. 1. XXVII. Abreaction. 2. XXVIII. Insight. XXIX. Changes that Take Place with Insight. XXX. Self-Insight. XXXI. Conditions and Devices for Gaining Insight. XXXII. Some Relationships Among Abreaction, Insight and Transference. XXXIII. Role of Anxiety and Growth in Psychotherapy. XXXIV. Identification of the Client with the Therapist. Bibliography. Index.

This is the second of three volumes, the first having dealt with *Principles* and the present one dealing with *Process*. The author is not a medical man, but a psychologist and a professor of education, and in this work he has produced another of those useful studies of psychotherapy which are coming from lay therapists. The book does not treat of an experimental project, of observed facts in clinical work. Nor is it, strictly, a critical evaluation of current concepts utilized in medical psychology. What the author has done is to set down the concepts he personally accepts, illustrating them and amplifying his views with condensed quotations (more often hypothesis and conjecture than empirical data) from psychotherapists of varying theoretical persuasion. He aimed to produce 'a text for students training for skill in psychotherapy in the several professions where its use is a method of helping individuals who seek help for personal problems'. Thus we are reminded that doctors are not alone in adopting the interviewing techniques derived from psychotherapy; not only patients in the medical sense, but also the 'clients' of social workers, probation officers, marriage guidance counsellors, etc. are receiving the benefits of 'case work' which rests on the principles of psychotherapy.

The important task of defining what processes occur in the course of psychotherapy is attempted. The author's theoretical model is a conventional one which most practising psychotherapists would probably accept. It may be stated as follows:

Psychotherapy is an *experience* of the person being treated. Through this experience therapeutic changes are effected. The experience occurs by way of a two-fold relationship. The chief agent of change in therapy is abreaction (i.e. a reaction with its full complement of emotion, repressed before the therapeutic experience) which, when made, releases tension and permits a curative process to take place. (There is great resistance against making this hitherto repressed reaction.) Insight follows, an inner realignment of forces, and the direction of the change is aided by identification of the client with the therapist.

More controversial is the author's contention that, while abreaction causes the change, permanent personality change can only be guaranteed by insight. Most therapists will have experienced deep and long-term alterations occurring in patients who do not clearly understand how the change happened. Nevertheless, the stress on insight is acceptable because account is taken of the general human need for understanding about ourselves and why our lives become bent on a particular course. However, this aspect of psychotherapy remains poorly understood. It may be, as Strachey (1934) held, that the doctor's interpretation is mutative. This could permit the alienated patient to undertake normal patterns of discharge for his sexual and aggressive urges. However, therapists who make varying interpretations according with their own theoretical training, appear to be equally helpful to their patients. Jung's claim that it is rehearsal of experience in the

presence of a physician which 'resolves the dissociation' leads on to the knotty problem of why the therapist should be so essential. Merely reciting hostile feelings, grief or frustration to oneself does not provide therapeutic relief. Self-rehearsal does not reduce tension and produce psychic relaxation: like masturbatory activity in general the release is localized and does not engage the whole personality. More important perhaps, in understanding why confession needs to be made to another person, is that the individual cannot counteract his own tendency to punish himself. If he fantasies forbidden acts he does not possess within himself the mechanism for forgiveness. Thirdly, as the writer repeatedly points out, once a patient has told his feelings to another person, those feelings are no longer private, walled off from change. He can carry his greater freedom to express himself out of the treatment room. But the neurotic person has devised his symptoms to protect his self against frightening outside situations and inner impulses which he is not able to face and accept. An unhealthy adjustment pattern is given up only after stress and turmoil, and the psychotherapist supports the patient by seeing to it that as neurotic protective devices are discarded, constructive reorientations have already been achieved by the patient, to avert the utter defeat of a patient admitting to himself the bankruptcy of his existence. Volume 3, *Procedures*, discussing the therapist's techniques in therapy, is eagerly awaited because it is here that the problems are thick and unresolved.

H.W.

CORRESPONDENCE : BRIEWERUBRIEK

NAUDÉ VERSUS WHITTLE

To the Editor: On behalf of the Eastern Pondoland Division and the Transkeian Branch of your Association, I should like to tender a vote of thanks to all the people who sent forward donations to the 'Naudé Appeal' Fund. Their co-operation was very much appreciated.

Margaret Barlow
Hon. Secretary, Eastern Pondoland Division

P.O. Box 1,
Lusikisiki, Transkei.
14 January 1958

THE AGE OF THE FOETUS

To the Editor: Many will share my disappointment in your Editorial 'The Age of the Foetus'.[1] Not only does this lack the quality of appraisal expected from an Editorial, but, being merely an abstract of Dr. Blair Hartley's recent article,[2] it is both inaccurate and incomplete.

Your author introduces his readers to his obstetric ignorance gently with the observation that 'any decision to terminate pregnancy is wholly dependent upon establishing viability'. By the end of the article the reader has a clear appreciation of the urgent need for radiologists to have some obstetric knowledge (and *vice versa*). Possibly the fault in this regard should be laid primarily at the door of our Medical Council, which regiments us into narrow specialities without making allowance for variation in individual capabilities and interests. Yet much valuable and important work could be done by interested and capable individuals wishing to overlap specialities.

Returning to radiological estimation of maturity, however, your author fails to mention certain elementary considerations which are vital to this appraisal:

1. Dr. Blair Hartley's results are (*a*) largely a personal success (which, in my view, will not be forthcoming from general usage of his methods, (*b*) partly the result of team-work of radiologists specializing upon a particular research project, and (*c*) partly the result of the extremely high standard of radiography which Dr. Blair Hartley sets in his Unit.

2. Precise estimation of foetal maturity from radiographs taken for other purposes. (e.g. cephalo-pelvimetry) will often prove unreliable. Special compression of the maternal abdomen is necessary before pilot A-P and P-A views are taken and an additional appropriate oblique view is then usually necessary.

3. The standard of radiography necessary is only possible in a *specialized* X-ray department, such as Blair Hartley's, with modern high-output X-ray machines, first-class intensification screens, and a limited volume of work.

4. In toxaemic patients the estimation of the maturity of the foetus is particularly unreliable and these babes often fail to develop a bone age which corresponds with chronological age. Inaccuracy is also to be expected in cases of hydramnios.

5. The radiological diagnosis of postmaturity requires special skill and is beset with pitfalls, being impressionistic and based upon consideration of a number of factors frequently manifesting mere shades of differentiation.

Finally, Sir, I would have expected an Editorial to have made mention of the fact that Dr. Blair Hartley and his team misjudged the date of delivery by more than 3 weeks (before or after delivery date) in no less than 1 case in 20 (5·5%) and their error lay between a fortnight and 3 weeks in 16·6% of cases.

A little obstetric knowledge would permit a culminating observation that—particularly in hands other than those of Blair Hartley and his team—radiological diagnosis of postmaturity offers to mother and babe the possibility of radiation hazard and unnecessary obstetric interference plus additional expense; to the obstetrician a blind inducement to interfere when this will often prove unnecessary; and to the radiologist additional work (and possibly additional remuneration) at the expense of frequent self-delusion.

Derk Crichton
Professor of Gynaecology

University of Natal
Durban
21 January 1958

1. Editorial (1958): S. Afr. Med. J., 32, 29.
2. Hartley, J. B. (1957): Brit. J. Radiol., 30, 561.

MALE/FEMALE BIRTH RATIO OF EUROPEANS IN WEST AFRICA

To the Editor: The article on 'Male/Female Birth Ratio of Europeans in West Africa' by Dr. M. D. W. Jeffreys[1] raises an interesting speculative point. Apparently while the normal male/female ratio is 1,039, 1,045, 1,051 and 1,055 (males born per 1,000 females born) in 4 European countries, this ratio is reversed in Europeans living in the hot moist climates of tropical Nigeria but is restored to normal in the upland district of Jos where the climate is relatively more cool and temperate.

Dr. Jeffreys' thesis is that the *y*-carrying sperm is smaller and more active than the *x*-carrying sperm. This thesis has not got any scientific backing and, arguing from this unsupported statement, the author concludes that 'if the motility is reduced, the reduction will have a greater retarding effect on the lighter and smaller *y*-carrying sperm than on the heavier and larger *x*-carrying sperm'.

I think Dr. Jeffreys has overlooked a factor that is well known to have a profound effect on spermatogenesis, viz. exposure of the testicles to heat.

In all tropical countries the primitive inhabitants wear little or no clothes where the climate is humid, as in Central Africa and Central America, and where dry heat is the rule the clothes worn covering the body are extremely loosely fitted. In this way the Arabs and the tribes in the Sahara wear very loosely fitting cloaks which do not interfere with the thermo-regulatory mechanism of the scrotum. This mechanism enables the testicles to be kept at a relatively cool temperature and permits normal spermatogenesis. The European comes from a colder climate where his relatively tightly fitting clothes are well adapted for normal spermatogenesis. In the tropics, however, the thermo-regulatory mechanism of the scrotum is seriously interfered with, and it may well be that the reason for the upset in the normal male/female birth ratio is this interference.

T. Schrire

17 Rugby Road
Cape Town
22 January 1958

1. Jeffreys, M. D. W. (1957): S. Afr. Med. J., 31, 1316.